Drivers of sustainable agriculture in a southern state

By

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A Thesis
Submitted to the Faculty of
Mississippi State University
in Partial Fulfillment of the Requirements
for the Degree of Master of Arts
in Applied Anthropology
in the Department of Anthropology and Middle Eastern Cultures

Mississippi State, Mississippi

August 2016
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This Master’s Thesis establishes what motivates a group of Mississippi farmers to participate in sustainable agriculture instead of industrial agriculture. A database of sustainable farmers was constructed in collaboration with the Gaining Ground Sustainability Institute of Mississippi. This research project used social network analysis with 28 farmers and participant observation and semi-structured interviewing with a purposively selected sample of 14 farmers. This project also explores the sustainable agricultural practices of participants. A map of the social network of sustainable agriculturalists in Mississippi is presented and shows that some farmers are well connected, some moderately connected, and others are isolated. As well, grounded qualitative analysis of interviews identified 4 primary motivations among participants: economic, health, self-sufficiency and anti-government. Overall this project found that motivations are numerous, social networks are weak but growing, and diverse demographics are turning to a sustainable model for agriculture in Mississippi.
DEDICATION

This Master’s Thesis Project is dedicated to my parents. Without their unending support and inspiration, I would not have finished kindergarten, much less this project. I would also like to dedicate this to my Fiancée, Meghan, who always knows how to push me the right way when I am lacking motivation and focus.
ACKNOWLEDGEMENTS

This thesis project would not have been possible without so many people and groups who helped me along the way. Foremost, I would like to thank all of the farmers who participated in this project. Without their patience during participant observation when I was “helping” them, I would have not even glimpsed the hard work they invest every day. My major advisor, David Hoffman, is also due significant gratitude for guiding me through a number of complications, large and small, along the way. I’m convinced I would never have seen the forest for the trees without his help. I am also indebted to the Gaining Ground Sustainability Institute of Mississippi for sponsoring my internship and allowing me to use the preliminary data I collected during that internship for this project. My path to sustainable farmers would have been much more difficult without their help. I deeply appreciate the time and effort applied by my thesis committee members, Becky Schewe and Toni Copeland, in advising and helping me finish this project, as well. Lastly, I would like to thank the other AMEC graduate students. We all had hiccups along the way, and helped each other through them; without that camaraderie, none of us would have made it this far.
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CHAPTER I
INTRODUCTION

Project Summary

Over the past 30 years, sustainable agriculture has become a popular alternative to conventional agriculture (Constance 2010; Guthman 2004). Because of its relationship with sustainability, local food systems and sustainable agriculture are often seen as instruments of environmentalism (Barlett 2011; Guthman 2004; 2000; Lotter 2008; McIlvaine-Newsad et al. 2008; Nelles 2011). Historically, Mississippi has had a strong focus on agricultural production but has been slow to adopt sustainable and environmentally friendly practices in agriculture and other industries (Shoreman and Haenn 2009). While anthropological studies of sustainable agriculture have been conducted around the world and the United States (Aistara 2008; Bell 2004; Guthman 2004; Mintz 2006; Netting 1993; Wilk 2006), there have been few that have focused specifically on sustainable agriculture in the state of Mississippi or across the Deep South.

This project focuses on farmers’ motivations to participate in sustainable agriculture within the state of Mississippi and also presents information about the structure of their social networks. An exploration of what drives Mississippi farmers to participate in sustainable agriculture instead of the much more popular conventional/industrial agriculture is presented. This research also determines the
structure of a portion of the social network of sustainable farmers in Mississippi. The specific research questions that guided the development, implementation, and analysis are:

1. Are self-identified sustainable farmers in Mississippi drawn to sustainable agriculture only because they see that there is a market available, or are there social or environmental motivations for their employment of alternative agricultural methods?

2. How are the social networks of the sustainable agriculturalists in Mississippi constructed?

3. Do their social networks create a sense of community that reinforces participation in sustainable farming?

4. Are there specific groups that are being drawn to sustainable agriculture in Mississippi (i.e., young farmers, new farmers, traditional farmers, etc.)?

5. Are the sustainable agriculturalists in Mississippi involved with organizations or institutions that can standardize sustainable agriculture and do these organizations or institutions affect their values and beliefs about sustainable agriculture (i.e., CSA, Certified Organic, Certified Naturally Grown, etc.)?

This research seeks to address the questions listed above because the anthropological examination of the motivations and networks of small-scale, sustainable
agriculturalists in Mississippi is deeply lacking. While there has been an anthropological examination of sustainable methods employed by conventional farmers for economic reasons in Mississippi (Shoreman and Haenn 2009), there has not been any examination of small-scale, self-identified sustainable farmers in Mississippi.

**Argument Summary**

The following Master's Thesis addresses the above listed research questions to demonstrate the following: (1) specific ideas and concepts that motivate sustainable farmers in Mississippi to participate in sustainable or alternative agriculture; (2) the engagement Mississippians have with the national dialogue of alternative and sustainable agriculture; and (3) the structure of the social networks of sustainable agriculturalists in Mississippi. This study explores how the motivations of sustainable farmers in Mississippi follow, or deviate from, the three-pillar model of sustainability: economic, environmental, and social. The analysis of coded interview transcripts of participants produced participants’ motivations. These motivations were grouped into four categories and were established based on the participants’ primary reasons for employing sustainable agriculture on their farm. The groups of motivations are Economics, Health, Self-Sufficiency, and Anti-Government.

This research project establishes a baseline of methods and motivations of some small-scale, self-identified, sustainable farmers in the state of Mississippi, and contributes to a larger discussion of sustainable agriculture in Anthropology as a case study based in the Deep South. An anthropological understanding of alternative agriculturalists in Mississippi is a critical first step in the exploration of deeper questions and trends that may be present with the participants in this study and other farmers in the Deep South.
order to for this research to be relevant, however, an adequate grasp of the literature of sustainability and agriculture was required for the researcher in the design of this project. As well, this information is critical for the reader to understand how this research contributes to the larger body of research of sustainable agriculture. The following chapter presents and explores the relevant literature that frames the rest of this document and establishes that baseline for both the reader and the researcher.

This research project does not establish a specific definition of sustainable agriculture. Instead, participants’ definitions of sustainable agriculture are used to explore what sustainability means to each individual. To understand motivations, one must first understand the practices that are driven by the motivations (Ortner 1984). Examining specific techniques (such as rotational grazing) as a means of bringing clarity to a broad and enigmatic system (such as sustainable agriculture) is a critical tool of ethnography and anthropology (Bourdieu 1972; Ortner 1984). Practice theory is employed in this project to explore sustainability and sustainable agriculture, as defined by the participants’ actions and applications of sustainable agricultural methods. This study concludes that self-identified, sustainable farmers in Mississippi produce a sustainable agriculture that can be framed within the three pillars of sustainability model.
CHAPTER II
LITERATURE REVIEW

In order to address the research questions above, a review of the supporting fields of literature is presented in this chapter. The first section of this chapter explores sustainability and how it has evolved over the past 75 years. As sustainability is the foundation of this research project, it is important to understand the roots and progression of sustainability throughout history. The second section reviews sustainable agricultural literature, as sustainable agriculture is the primary focus of this research project. This section examines the history of sustainable agriculture, trends within the application of sustainability to agriculture, and the current anthropological research of sustainable agriculture in Mississippi. Finally, the last section of this chapter examines industrial agriculture, with a focus on the history and conventional applications in the Deep South. The historical information presented in the third section connects the current trends in agricultural practices to the roots of conventional American agriculture, which formed at the end of the Civil War.

This research project lays the groundwork for exploring self-identified sustainable farmers in Mississippi and across the Deep South. This study also contributes to the current research of sustainability, agriculture, and sustainable agriculture. Specifically, this research builds on Eleanor Shoreman’s (2009) anthropological research of conventional farmers in Mississippi applying sustainable methods on a large scale, by
examining her participants’ counterparts in the state: small-scale, self-identified, sustainable farmers (Shoreman 2009; Shoreman and Haenn 2009).

**Sustainability**

An initial examination of sustainability requires the establishment of a most basic definition of the word itself. Biologist Richard T. Wright (2008:663) describes sustainability as a specific property of a process which, "can be continued indefinitely without depleting the energy or material resources on which it depends." Wright (2008) presents a literal definition of the word; however, sustainability has acquired many meanings across disciplines during its history (Fricker 1998; Sarewitz 2001). The United Nations established international concerns of sustainability when the Brundtland Commission released *Our Common Future* (WCED 1987). After the Brundtland Commission, sustainability rapidly began infiltrating many public, private, and academic fields, due to a demand for environmental awareness (Constance 2010; Netting 1993). Although sustainability gained global popularity and importance, it also became cliché. Allan Fricker (1998:181) even goes as far as to say, “sustainability, at least as a concept, has permeated most spheres of life…”

The rapid rise in popularity of sustainability since the Brundtland Commission may be due to its ability to be easily redefined. Many would argue that the word 'sustainability' has become hackneyed because it has been used (correctly and incorrectly) to describe many different disciplines, practices, and ideas (Altieri 1993; Mirovitskaya and Ascher 2001; Netting 1993; Redclift 1993). Daniel Sarewitz (2001:74) says, “Sustainability has been criticized as a woolly, ambiguous concept that is resistant to precise definition, fraught with internal inconsistencies, and difficult to apply in
practice.” While the original definition presented in this chapter by Wright (2008) may seem obvious, the literal meaning of the word is often forgotten or ignored. Since the definition of sustainability has been so elusive and since sustainable agriculture is deeply seated in sustainability, the following sections of this chapter will address: the beginnings of sustainability, sustainability and international development, and the three pillars of sustainability. These sections are designed to clarify how sustainability has changed through time and within different disciplines, while also providing the reader a sense of how sustainability affected sustainable agriculture and this research project.

The Beginnings of Sustainability

In the Global North, or the developed nations, there has been a push for sustainable agriculture since the 1940s when the father of organic farming, Sir Albert Howard, began to examine and deviate from conventional (unsustainable) agricultural practices (Aistara 2008; Guthman 2004). His refusal to participate in conventional agriculture, which required an ever-increasing amount of fossil fuel inputs, was the foundation of the sustainable agriculture movement (Guthman 2004). Howard and his colleagues continued to advocate for a more natural and ecological agricultural system. As biological and ecological systems were proven to be able to maintain themselves, Howard’s (1940) contention was that an ecological approach to agriculture was sustainable. Concurrently, the conventional agricultural system began to increase its dependence on fossil fuels by increasing the use of synthetic pesticides and fertilizers that would push conventional agriculture even further from the sustainable and organic methods. The discovery and mass usage of synthetic chemicals in agricultural production,
along with the dissemination of technology to the developing world, was coined in 1968 by William S. Gaud as the “Green Revolution” (Evenson and Gollin 2003; Gaud 1968).

The Green Revolution started in the late 1950’s and gained momentum into the mid 1960s. For a succinct description of the beginning of the Green Revolution, we turn to Evenson and Gollin (2003:1) who say, “In the mid-1960s, scientists developed [modern high yielding crop varieties] of rice and wheat that were subsequently released to farmers in Latin America and Asia. The success of these [modern high yielding crop varieties] was characterized as a ‘Green Revolution.’” Many of the advancements made during the green revolution were due to plant breeders hybridizing varieties of plants that produced increased yields or were capable of thriving in climates that they were not capable of before (Evenson and Gollin 2003). Once many of these plant varieties took hold with farmers, the farmers also began using fossil fuel based chemicals to increase their yields even further (Pimentel 1996). These chemicals were herbicides, insecticides, and fertilizers that were applied to the soil or the plants to increase the annual yield of the crops (Pimentel 1996). Many saw rise in the routine application of chemical additives in agriculture as a problem for a number of reasons, including dependence on a non-renewable resource (Pimentel 1996), secondary effects of the chemicals (Carson 1962; Kinkela 2011), and a Global South dependence on chemicals produced in the Global North (Shiva 2000).

The issues pointed out by environmentalists and biologists above were also addressed by other biologists when they began writing books about the negative consequences of the Green Revolution. The first prominent and public reaction to the pesticides of the Green Revolution, specifically DDT, was marine biologist Rachel
Carson’s *Silent Spring* (1962). Many authors mark this book as the beginning of the environmental movement (Allen 1993; Allen and Sachs 1993; Bell 2004; Constance 2010; Elkington 1997; Guthman 2004; IISD 2002; Jackson 2002; Luke 1995; Weis 2007). Following Carson’s influential book, Paul Ehrlich’s (1968) book *The Population Bomb* addressed the issue of the overpopulation of the Earth for the first time. The Green Revolution had increased the amount of food that was available in the world, and thus was linked to increasing the global population (Ehrlich 1968). Ehrlich (1968) applied the ecological model of the carrying capacity of a species within an ecosystem to humans and their relationship with the Earth as an ecosystem. He suggested that without some change in how humans interact with the Earth, i.e. more sustainable interactions, the number of humans will surpass the carrying capacity of the Earth and the population will crash due to overuse of resources. Ehrlich and Holdren (1971) later attempted to formulate a way to quantify the impact that humans had on the Earth with the formula \( I = P \times A \times T \). This formula, where \( I \) is human impact on the environment, \( P \) is population, \( A \) is affluence, and \( T \) is technology. This formula was the first time someone suggested that human impact on the planet could be quantified and that humans have a rapidly multiplying effect on the planet because of populations’ relationship with consumption and technology (Ehrlich and Holdren 1971).

Lastly, the third book critical in the formation of the concept of sustainability was called *The Limits to Growth* (Meadows et al. 1972). This book also addressed many of the same population concerns voiced by previous scholars. *The Limits to Growth* was unique at the time because it was written by authors from many different fields. While there were no individuals who were explicitly criticized, these authors were focused on
the Global North's assumption that the human species would be able to grow exponentially on the Earth forever without consequences (Meadows et al. 1972). Although it may seem surprising that this needed to be explicitly stated, at the time this book was published, the Global North was shifting towards Milton Friedman’s (1964) neo-liberal economic perspective and increasing the reach of the free market across the globe (Preston 1996). Friedman’s free market economic system did not consider resources as having limits, but rather as having horizons that were to be surpassed with technological advancement (Leys 2005). Everyone knew that there were only so many trees on the Earth, for example, but many in Friedman’s camp believed humans would never approach the physical limit of consumption of lumber. Meadows et al. (1972) were countering the neo-liberal dogma by publishing an interdisciplinary landmark that warned against the depletion of the Earth’s natural resources and advocated sustainable economic, environmental, social, industrial, and consumption practices (Meadows et al. 1972).

These three books, along with a growing alternative agricultural movement in the United States generated a strong environmental movement in the 1960s and 1970s (Constance 2010; Kinkela 2011). The environmental movement began to examine the extractive and unsustainable use of resources by the Global North. To counter the extractive policies and practices of Western and capitalist society, many authors and scientists expanded the discussions of sustainability over the next few decades (Allen 1993; Fricker 1998; Lapping 1997; Meadows et al. 1972; Netting 1993; Redclift 1993). By 1980, the word sustainability was not widely overused and to many it simply meant putting more energy into a system than is taken out (Kidd 1992). However, the following
section demonstrates how sustainability has since been co-opted and diluted by a number of different organizations and institutions to fit their goals more appropriately with a focus on global applications, namely international development (Costanza and Patten 1995; Dawe and Ryan 2003; Gardener and Lewis 1996; Gould and Lewis 2006; Guthman 2004; Mosse 2005; Netting 1993).

**International Development and Sustainability**

International Development has been a global influence since the end of World War II. Colonialism became globally unpopular because it was perceived as a primary motivator for the beginning of the Second World War on both the European and Asian fronts (Escobar 1995; Gardner and Lewis 1996; Nolan 2002). While decolonization was on the rise, the superpowers of the world were still interested in controlling and accessing the resources of the Global South and, thus, international development was born (Escobar 1995; Nolan 2002). Many critical scholars would say that development was the newest form of colonialism (Escobar 1995; Gardner and Lewis 1996). Gardener and Lewis (1996:8) directly state their critique of development as a new colonialism when they say (referred to here as ‘aid’), “Aid from the North to the South was without doubt a continuation of colonial relations, rather than a radical break from them.” In the first speech by an American President that addresses the topic of development, Harry Truman ([1949] 1964) says, “…Greater production is the key to prosperity and peace. And the key to greater production is a wider and more vigorous application of modern scientific and technical knowledge.” This quote from President Truman is indicative of the hegemonic presumptions of the Global North that were deeply neo-colonial (Gardner and Lewis 1996). Examining sustainability from the aspect of international sustainable
development is vital to establishing the discourse of sustainability as a whole because development has shaped global sustainability initiatives, which fed directly into local applications of sustainability.

Many debates about the motivations and goals of development ensued and one of the proposed solutions to the extractive nature of development was sustainable development. A focus on the extractive nature of international sustainable development is important because some of the critiques of sustainable development are very similar to the critiques of sustainability (and thus, sustainable agriculture). It should be noted that sustainable development is something that is applied on an international scale bilaterally (from one nation state to another) or multilaterally (from many nation states to many nation states via International Financial Institutions). Sustainable development, especially on an international scale, has been a distillation of sustainable practices and implementations that were supposedly perfected in the Global North and then applied to the Global South.

The United Nations World Commission on Environment and Development (WCED, also known as the Brundtland Commission) defined sustainable development as, “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED 1987). This definition is vague and broad, but James C. Scott (1998) would argue that, since this definition is so simple, it allows the "state" to be effective in applying the definition to a multitude of development projects and people. Much of Scott's (1998) work suggests that when the state defines a policy so vaguely, they are capable of making progress that qualifies under the ambiguous definition, but actually requires little change in practices. The WCED
definition and the subsequent global oversimplification of sustainability is a perfect example of what Scott (1998) described and has been crucial in the labeling and creation of all things sustainable.

Sustainable development was not inherently bad or exploitative, however. Bryant and Bailey (1997) say that developmentalists in the Global North recognized the level of poverty that was present in the Global South and the North saw it as their responsibility to help pull the Global South out of poverty and exploitation from the South’s own governments (Bryant and Bailey 1997). Also, while scholars like Scott are critical of the WCED definition and its oversimplifying role, many argue that the applications of sustainable development have been beneficial, if only for the fact that the environment and social justice entered the development discourse (Altieri 1993; Escobar 1995; Goodman 1993; Gould and Lewis 2006; Guthman 2004; Redclift 1993; Stone 2003).

The Brundtland Commission was important to sustainable development in that it established a worldwide definition of the term. After the WCED, however, the rest of the UN needed to convene and establish how this was going to affect global policy. In 1992, the United Nations Convention on the Environment and Development (UNCED, also known as the Earth Summit) was held in Rio de Janeiro (UNCED 1992). The WCED made sustainable development a global issue, but the Earth Summit was when actual implementation arrangements were made for many realms of development. There were three critical documents published by the UN at the end of this conference: “Agenda 21”, “The Rio Declaration on Environment and Development,” and “The Statement of Forest Principles” (UNCED 1992). There were also two legally binding conventions adopted at UNCED: “The International Framework Convention on Climate Change (IFCCC)” and
the “Convention on Biological Diversity” (CBD) (UNCED 1992). These UN publications and conventions established a foundation for the global political structure of sustainable development for the next two decades (Escobar 1995; Gould and Lewis 2006; Hopewood, Mellor and O'Brien 2005; Silva 1997; Stefanovic 2000; Taylor and Buttel 1992; West 2006).

Sustainability’s ubiquitous application to development and other fields in the 1990s and 2000s created a significant demand for a capability to assess sustainability. Many different organizations and industries have not only attempted to define sustainability, but have also developed methods of assessing sustainability. The three pillars of sustainability are a critical delineation of sustainability that lies at the foundation of many of these models of assessment (Pope et al. 2004).

The Three Pillars of Sustainability

Defining, demonstrating, and measuring sustainability has been controversial since the WCED first defined sustainability in the 1980s (Toman 1992). The most commonly agreed upon set of tenets used to define sustainability are the three pillars of sustainability: economy, environment, and society (Dawe and Ryan 2003; EPA 2012; Gould and Lewis 2009; Lapping 1997; Pope et al. 2004; Reid and Dower 1997; United Nations 2005; United Nations Sustainable Development 1992). The economy portion of the three pillars is intended to ensure that an institution (public, private, or otherwise) employing sustainability has an economic plan that is at least making enough money to cover its costs, and, ideally, also making a profit (Gould and Lewis 2009). The environment portion of the three pillars model is intended to ensure that the same institution is accessing environmental resources in a way that is not extractive, but
mutually beneficial to the institution and the environment (Dawe and Ryan 2003; Elkington 1997; Gould and Lewis 2009). For example, a logging company can replant an equal or greater number of trees than are being cut down. The society portion of the three pillars attempts to ensure that the individuals working for the institution, or who are affected by the institution, are being treated fairly (Dawe and Ryan 2003; Gould and Lewis 2009). As well, the society portion addresses the community in which the institution is located. The institution should recognize that their policies and practices affect the surrounding community and should ensure that their actions benefit the community (Gould and Lewis 2009).

The critical focus of the three pillars model of sustainability is that all three should be given an equal consideration when sustainability is a focus of a project or process (Dawe and Ryan 2003; Gould and Lewis 2009). An allegory that is popular in describing the three pillars of sustainability asks one to imagine that each pillar as a leg of a stool and the top of the stool is sustainability. Ideally, each leg must be of equal length for the stool to be sturdy in its support of sustainability (Constance 2010; Dawe and Ryan 2003). Unfortunately, sometimes groups and organizations say that they are using sustainable methods but in-actuality emphasize one pillar more than another. For example, a business may focus on the monetary bottom line while making sacrifices in the other two categories. Similarly, an environmental non-profit may focus more on environmental quality, but sacrifice societal or economic sustainability. While there have been arguments that the stool analogy is flawed (Dawe and Ryan 2003; Wass et al. 2011), it is the most popularly applied explanation of sustainability (Dawe and Ryan 2003) and thus is used in this project.
Assessing the sustainability of a system has become an industry in itself (Pope et al. 2004). When assessing the sustainability of a particular system, one must be able to measure characteristics that meet each of the pillars of sustainability. Many different groups have attempted to measure sustainability, but most use the same basic model of identifying sustainability indicators for each of the three pillars (Gliessman 2001; Singh et al. 2009). A specific system is then examined and an assessment is made on whether or not that system meets the sustainability indicators for each pillar. This should indicate whether or not the system is sustainable, but generally if the monetary, environmental, and social outputs of the system are greater than the inputs to the system, the system is considered sustainable (Wass et al. 2011). While measuring the monetary inputs and outputs are usually relatively simple, the other two categories have proved to be difficult to quantify and measure (Constance 2010; Dawe and Ryan 2003; Guthman 2004; Wass et al. 2011).

Sustainability has been a global trend that has penetrated the majority of public, private, academic, and non-profit projects and discussions (Dawe and Ryan 2003). Throughout this section we have examined the foundations of sustainability as a product of the environmental movement in the United States in the 60s and 70s (Allen 1993; Guthman 2004; Pimentel 1995; Preston 1996). Sustainability also became popular and the international development community was pressured by environmentalists to incorporate discussions and sustainable principles into projects across the globe (Bryant and Bailey 1997; Gardener and Lewis 1996; WCED 1987). As sustainability became oversimplified, many tried to establish specific principals and definitions and the three
pillars of sustainability model prevailed (Dawe and Ryan 2002; Elkington 1997; Gillesman 2001; Gould and Lewis 2009; Wass et al. 2011).

As sustainability gained momentum across the globe, sustainable principles were also being applied to agricultural production in the US (Guthman 2004). The following section will discuss how sustainability has been applied to agriculture in the US. This section will review the history, principles, and benefits of sustainable agriculture, as well as discuss sustainable agriculture in Mississippi.

**Sustainable Agriculture**

This section will discuss the literature that is more directly related to sustainable agriculture. As discussed above with sustainability, sustainable agriculture also has many definitions and has become hackneyed. This section will present a few definitions of sustainable agriculture that were used to frame this research project. It will also discuss the definitions and history of sustainable agriculture, different types of sustainable agriculture, and how sustainable agriculturalists access markets. The types and markets of sustainable agriculture are important to examine because many of them are concomitant with relationship and community building that may affect the farmers’ continued use of sustainable or alternative agricultural practices. Market access is important for both farmers’ and consumers’ continued participation in sustainable agriculture because the markets that alternative farmers access are suggested to help build networks, provide healthier or more authentic food, and “reaffirm entrepreneurialism and individualism” (Slocum 2008:213).

The study of food has long been considered an imperative, yet under-examined, subject in much of the anthropological literature (Counihan and Van Esterik 2012; Mintz
and Du Bois 2002). There is a long history of anthropological investigation of issues related to food that has been essential in examining multiple aspects of culture (Guthman 2003; Harris 1985; Mead 1971; Mintz 1985; Netting 1993; Wilk 1999). Since so many people are now dependent on some form of agricultural system to obtain their food, the investigation of conventional (Chibnik 1987) and non-conventional (Stanford 2006) agricultural production has become a major sub-field of the Anthropology of Food and Eating (Bell 2004; Guthman 2004; Hinrichs 2007; Schlosser 2001; Wells 1996; Wilk 2006). Food and agriculture, specifically sustainable agriculture, has also increasingly become the subject of popular writing and media (Counihan and Van Esterik 2012; Kenner 2008; Pollan 2008).

The popularity of sustainability has bled over into sustainable agriculture, but so also has the uncertainty and ambiguity of sustainability (Bell 2004; Guthman 2004). Therefore, the first portion of this section will focus on the formation of definitions of sustainable agriculture. The second subsection presented here examines the markets accessed by sustainable and alternative farmers and discusses both the benefits and drawbacks. This is followed by a deeper examination of the perceived and realistic societal and community benefits of sustainable agriculture, both to the farming community and the consumer community. Finally, the last subsection presents a short summary of other studies examining sustainable agriculture in Mississippi, specifically.

**Defining Sustainable Agriculture**

Definitions of sustainable agriculture, and the organizations which helped to define and standardize sustainable agriculture, are presented in this subsection. The history of the inception and delineation of sustainable agriculture is important to discuss.
so that the current state of sustainable agriculture can be more thoroughly comprehended. This will also provide a basis to examine the motivations of the sustainable farmers who participated in this research project. Howard (1940) and the organic movement, as well as sustainable development, influenced sustainable agriculture and its many subdivisions (Guthman 2004). As one would imagine, with the vague discussions about and definitions of sustainability presented above, sustainable agriculture is also very hard to define. Some say that sustainable development has led only to the labeling, and increasing banality, of sustainable agriculture (Gould and Lewis 2006; Guthman 2004). Allen and Sachs (1993) are slightly more critical, however, saying ‘sustainable’ has been attached to many agricultural practices by organizations or individuals who want nothing more than to appear to be a part of the movement and continue with “business as usual.”

For the sake of a starting point, however, Julie Guthman (2004:220) defines sustainable agriculture as, “a system of agricultural production and distribution that integrates environmental health with economic profitability.”

Jackson and Jackson very simply define sustainable agriculture as, "agroecological restoration" (2002:6). What they mean by agroecological restoration is that sustainable agriculture should encourage the development of a community of natural organisms so that the farmer creates an agricultural space that is similar to an ecosystem. The ecosystems Jackson and Jackson (2002) were referring to have multiple organisms that provide benefits to each other at some point during their life cycle (pollinators, nitrogen fixers, pest control, etc.). Agroecology was a response to the conventional agricultural system from academically trained ecologists and agronomists (Allen 1993; Buttel 1993; Carrol 1990; Carroll et al. 1990; Gliessman 2001; Lotter 2008). Stephen R.
Gliessman (2001:3) defines a sustainable agroecosystem as something that, “maintains the resource base upon which it depends, relies on a minimum of artificial inputs from outside the farm system, manages pests and diseases through internal regulating mechanisms, and is able to recover from the disturbances caused by cultivation and harvest.” This definition is concise and, although it still has some of the vague qualities of many sustainability definitions, it also is more restrictive than most definitions of sustainable agriculture because it does establish some specific topics that should be addressed on a farm that are considered sustainable.

Anthropologist Robert Netting focused specifically on smallholders, whom he defines as, "rural cultivators practicing intensive, permanent, diversified agriculture on relatively small farms in areas of dense population” (Netting 1993:2). Although he cites many definitions of sustainability and sustainable agriculture, he emphasizes the contrasting yields and energy ratios between industrial agricultural practices and sustainable agriculture practices (Netting 1993). What Netting is referring to here is the fact that industrial agriculture currently relies heavily on inputs from fossil fuels. The Nitrogen based fertilizers, the gasoline and diesel required for mechanized agricultural production (and to transport the food after production), along with many other petroleum based inputs, would be what Netting (1993) considers unsustainable, because of the amount of energy that is invested in comparison to the amount of energy that is produced.

Netting focuses on industrial agricultural production methods but his primary argument does not concern conventional agriculture’s dependence on a finite resource (fossil fuels). Netting says that conventional agriculture is actually less efficient than sustainable agricultural practices (Netting 1993). He makes this claim by analyzing
conventional and sustainable agricultural production in terms of calories in versus calories out. By measuring and comparing the ratios of the energy used to produce food and the energy contained within the food, Netting (1993) argues that sustainable agriculture is more efficient than conventional agriculture.

For example, Netting calculates how many kilocalories (kcal) of fossil fuel energy are required to produce 1 kilogram (kg) of nitrogen fertilizer, and then how much of that fertilizer is used in the agricultural production of rice in the United States. Netting says that rice production required, “an almost unbelievably low 17 man-hours per hectare, . . . required so much nitrogen fertilizer, diesel fuel, pumped water, drying, seeds, and herbicides that the energy ratio was 1.55 kcal produced for every 1 kcal of energy spent” (Netting 1993:124). In contrast, rice produced by the Iban people in Malaysia using shifting cultivation produced 7.08 kcal per 1 kcal of energy spent. Netting goes on to provide multiple examples of non-mechanized agricultural production to demonstrate disparities in energy efficiency between conventional and non-conventional agriculture.

Based on caloric input and output data that he analyzes, the agricultural practices of smallholders for particular crops in the Philippines, Sudan, Malaysia, Mexico, Tanzania, and China can be anywhere from two to seven times more efficient than industrial agricultural food production of the same crop in the United States (Netting 1993). Thus, Netting defines sustainable agriculture as, “the combination of stable and diverse production with high yields, internally generated and maintainable inputs, favorable energy input / output ratios, and articulation with both subsistence and market needs” (Netting 1993:137).
Netting’s (1993) definition of sustainable agriculture and his critique of the United States’ industrial agricultural model were important contributions to the field of Anthropology of Food and agriculture. However, sustainable agriculture’s rise in application by farmers in the U.S. was driven by consumers pushing to have sustainable agriculture regulated (Constance 2010). Many sustainable farmers, and consumers of sustainable agricultural products, use the National Organic Program or other regulatory groups as a baseline for production methods, even if they do not seek certification from these agencies (Guthman 2004; Stanford 2006). Therefore, it is critical to this body of work to understand how these agencies were formed and what standards of sustainable agriculture were and are used by these agencies.

In the United States sustainable agriculture was first addressed by regulatory agencies in 1985, before the WCED met and wrote *Our Common Future* (1987). Under heavy pressure from lobbying groups for alternative agriculture and the organic movement, Congress passed The 1985 Food Security Act, which required the United States Department of Agriculture (USDA) to create the Low-Impact Sustainable Agriculture (LISA) project (Constance 2010). The goal of the project was to, “develop and promote widespread adoption of more sustainable agricultural systems” (Constance 2010:51). Although the U.S. Congress was addressing the concerns of the alternative agriculture activists with this Act, conventional agriculturalists reacted against it, claiming that that this project would detract from their sales and markets (Constance 2010). The pricing issues the conventional farmers raised were very influential with policy makers and painfully relevant to fellow farmers because of the Farm Crises of the
1980s, which drove food prices down and farm closures up (Bell 2004; Constance 2008, 2010; Hinrichs et al. 2004).

The 1990 Farm Bill changed LISA into the Sustainable Agriculture Research and Education (SARE) program (Constance 2010), and solidified the US government's recognition of sustainable agriculture. SARE had slightly different objectives than LISA because SARE provided funding to help farmers implement sustainable agricultural methods and funding to do research for sustainable agricultural innovation. SARE was made up of two different programs: The Research and Education program and the Professional Development Program. The Research and Education program granted monies for, “the development of sustainable agriculture innovations/practices” (Constance 2010:52), and the Professional Development Program granted monies for, “‘train the trainer’ projects with the goal to diffuse the sustainable agriculture innovations/practices from farmers to agricultural educators” (Constance 2010:52).

Researchers of SARE suggest that the research done by farmers participating in the program have, "solid, real-world results" (Boody 2002:270). For example, SARE “has directed research dollars—$13 million in 2000—into sustainable agriculture, and has done so through the participation of diverse stakeholders” (Boody 2002:270).

According to Constance SARE defined sustainable agriculture with the following four criteria:

1. Satisfy human food and fiber needs;

2. Enhance environmental quality and the natural resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls;
3. Sustain the economic viability of farm operations; and

4. Enhance the quality of life for farmers and society as whole.

[Constance 2010:52]

This definition is important because, although these are not laws, they are guidelines from the U.S. government for the administrative agency (the USDA) to follow when considering programs concerning sustainable agriculture. While SARE does not mention the three pillars of sustainability, their definition of sustainable agriculture is obviously related to the three pillars model. Another important detail regarding SARE's definition of sustainable agriculture is that it was more specific than previously established definitions. However, many researchers, farmers, and consumers also thought that it was not specific enough because it did not establish what is not sustainable (Constance 2010; Gliessman 2001; Guthman 2004; Lotter 2008).

The reader should note that SARE's definition of sustainable agriculture is unique from other definitions of sustainable agriculture in regards to each of the criteria listed above. The first criterion does not address sustainability, but the USDA's interpretation of how to handle the country's vast need for agriculture. The second addresses the environment more strongly than it had ever been addressed in agriculture on a national scale (Guthman 2004) and sounds somewhat like Jackson and Jackson's (2002:6) "agroecological restoration" because it addresses integrating natural cycles. Number three addresses the economic aspects of agriculture, which was the main critique of LISA by conventional agriculturalists. And lastly, the third pillar of sustainability (social justice) is glossed over in number four, as society is only generally addressed. Admittedly, the other
three criteria of the definition are also broad, but this fourth criterion doesn't even mention the justice portion of social justice. While it does mention the quality of life of the farmers, SARE’s definition only addresses social issues in terms of farmers, not their employees, consumers, community, neighbors, etc. This is unsurprising, however, since the avoidance of social justice issues has been a critique of sustainable agriculture and is demonstrated by Allen and Sachs (1993:143) when they say that sustainable agriculture, “[does] not question the inequities many people experience in current structures of family farms, rural communities, or agricultural labor.” Other authors have also critiqued agriculture, conventional and sustainable alike, for inadequately addressing inequality (Guthman 2004; Redclift 1993; Schlosser 2001; Wells 1996).

Julie Guthman (2004) has critiques of sustainable agriculture. First, it is important to note that she critiques the ambiguity of the term when she says it is, "another broad term for nonconventional agriculture" (Guthman 2004:220). She is critical here because she is focused on exposing many of the misconceptions connected to sustainable and organic farming. She goes on to say, "as applied in the United States, sustainable agriculture usually refers to a system of agricultural production and distribution that integrates environmental health with economic profitability" (Guthman 2004:220). Guthman is directly critiquing sustainable agriculture in the United States only operates with of two of the three pillars: economic and environmental. She also points out that there is often a problem with many terms being used for the same thing, i.e., sustainable agriculture, nonconventional agriculture, and alternative agriculture may or may not all be used interchangeably (Guthman 2004). This is problematic because unclear definitions produce confusion. Some authors would argue that the confusion generated in this
manner is intentional and could be used as a tool for farmers or organizations to appear sustainable without committing to a particular set of rules or ideals (Guthman 2004; Scott 1998).

Guthman attempts to eliminate that confusion in her writing by bifurcating agriculture into two categories: conventional agriculture and alternative agriculture. She does this to avoid the distraction and obfuscation that can be involved with other categorizations because she is analyzing and critiquing sustainable agriculture (Guthman 2004). The distinction in categories of agriculture made by Guthman (2004) is important and recognized across the field because the word ‘alternative’ has connotations that are less politically charged. For example, ‘sustainable farming’ insinuates that any other kind of farming is ‘unsustainable,’ and thus, bad. While some people may intentionally use ‘sustainable’ with a positive connotation and ‘conventional’ with a negative one, this practice can create unneeded and unconstructive conflict.

This subsection has demonstrated that sustainable agriculture is often easily affected by the obscurities of sustainability. Individuals apply sustainability to their lives and businesses for many different reasons (Bell 2004; Guthman 2004; Netting 1993; Slocum 2008). In order to have a better grasp of sustainable agriculture in Mississippi, this research project employs practice theory (Ortner 1984) to allow farmers’ actions to demonstrate their own definitions of sustainable agriculture.

**Markets of Sustainable Agriculture**

Understanding how the many markets of sustainable agriculture work is critical to having a substantial understanding of what sustainable agriculture looks like and how the sustainable agricultural community works. This subsection will define the markets of
sustainable agriculture that are not novel, but were used by participants in this research project. It is important to explore all the market relationships of alternative and sustainable agriculture because any one or combination of them has the potential to become a motivation for continued farmer participation in sustainable agriculture. Since this project seeks to explore what motivates farmers to participate in sustainable agriculture via practice theory, establishing which markets they participate in and why is also critical (Ortner 1984).

While sustainable agriculturalists sometimes have access to traditional market relationships, such as grocery stores, Lois Stanford (2006:181) suggests that there are six alternative market relationships that create “new linkages between producers and consumer.” These markets are, "(1) farm-to-restaurant; (2) farm-to-school; (3) farmers' markets; (4) cooperatives; (5) value-added products; and (6) community supported agriculture (CSAs)" (Stanford 2006:181). This list will be expanded and broken down below, since these market relationships are accessed by sustainable farmers in Mississippi.

Farm-to-restaurant is often characterized by an independent contract by the farmer and the restaurant owner. This contract usually requires the farmer to produce a certain amount of food that the restaurant will purchase on a regular or semi-regular basis. As part of the contract, the farmer oftentimes will even distribute their products directly to the restaurant, in a similar fashion to large-scale food distributors (Stanford 2006). The second, farm-to-school, involves a direct relationship between a farmer and a local educational facility (K-12 or higher education). The farmer provides food for the school to feed the students but, notably, the farmer sometimes also participates in the education
of the students by hosting visits to their farm for the students to learn about how food is
grown and from where their food comes (Stanford 2006).

Third in Stanford’s 2006 list are farmers markets, which have grown in popularity in
the past 30 years. Farmers markets are locations where farmers can gather at a
regularly scheduled time and sell their produce directly to a consumer. Farmers markets are usually the more commonly known markets available to sustainable agriculturalists. While consuming local food from farmers markets has been touted as positive by many (Mintz 2006; Wilk 2006), some scholars are critical of the varying amount of environmental impact across farmers markets, mostly because of concerns about food miles, which examines the total distance the food item travels between the farm and the consumer (Banwell, et al. 2006; Sirieix et al. 2008). These scholars caution that farmers markets may not be as environmentally considerate as other markets of sustainable agriculture for a number of reasons.

As well as concerns about food miles, scholars raise concerns about the willful ignorance of consumers who often assume that produce at a farmers market is different or better than produce at a grocery store (Hinrichs 2000; Sirieix et al. 2008; Wolf et al. 2005). Farmers markets are regulated by the individual market manager who has some discretion in making that market’s rules. These market managers may be more or less environmentally conscious across a region and those rules can then become embedded as norms within the culture (Hinrichs 2000). Also, shoppers at farmers markets often assume that local and small scale producers are more environmentally sustainable or that they are selling goods that are healthier for the consumer (Wolf et al. 2005). However,
these farmers may not be any more environmentally sustainable than other agriculturalists (Hinrichs 2003).

The fourth on Stanford's (2006) list, cooperatives, may be more familiar to someone who has agricultural experience, conventional or not. Cooperatives are common in the agricultural realm and allow farmers to share the financial risk that may be associated with certain services (USDA RD 1996). The USDA's Rural Development agency says that the purpose of a cooperative is, “to provide greater benefits to the members such as increasing individual income or enhancing a member’s way of living by providing important needed services” (USDA RD 1996:1). The most common type of agricultural cooperative in the U.S. is a supply cooperative, which allows the members access to supplies (such as mulch or seeds) that are usually procured in bulk. The cooperative purchases these supplies in bulk and then sells smaller portions of that item to farmers. While the cooperatives are often not markets, they do create relationships between farmers that decrease the farmer’s individual financial risk by lowering the cost of supplies of farmers. Cooperatives also eliminate the risk of farmers making bulk purchases of supplies, which are perilous due to initial expenses, transportation difficulties, and complexities of storage once procured.

The fifth type of market relationship listed by Stanford (2006) is value-added products. Value-added products are defined as any item that is produced on the farm and processed to add economic value before it is sold to the consumer, e.g., salsa produced from raw tomatoes and peppers (Stanford 2006; USDA RD 2013). These items may or may not be sold independently from other produce, but are considered a separate market relationship because something like jelly or canned goods is preserved and can be sold at
a later date, whereas raw produce must be sold very soon after harvest. Raw cuts of meat are also considered value-added products because the butchering of an animal adds monetary value to each individual cut of meat, which is regulated differently than whole animal sale (USDA RD 2013). While value-added goods are often sold via some of these other markets, i.e., at a farmers market, value-added goods are almost always packaged, and thus, can be sold by other stores and vendors. Farmers can also distribute their value-added goods to local stores to be sold there.

Community Supported Agriculture (CSAs) is the sixth and final linkage and market relationship discussed by Stanford (2006). CSAs remove much of the financial risk of farming from the farmer by requiring consumers to make an investment in the beginning of a year or season (Lang 2005; Stanford 2006). The investment by the consumer in the farm reduces or eliminates the farmers’ need for operational loans from banks. In return, the consumer receives farm produce regularly throughout the season. The CSA model distributes the risk of farming among the consumers and the producer, which, in theory, fosters stronger relationships between the farmer and the consumers. K. Brandon Lang (2005:62) defines CSAs when he says, ”The basic premise of CSA is that shareholders become members of a local farm and pay seasonal dues in return for regularly provided allotments of produce over the course of the growing season.” Occasionally, the shareholders are allowed to pay a portion (or all) of their share by doing what's called a workshare. Workshares are when the shareholder goes to the farm and pays the CSA farmer in hours of work, instead of a fiat currency (Hinrichs 2000). These workshares are the easiest way for the shareholder/consumer to gain knowledge about how their food is produced, and can also produce a strong sense of community within the
CSA (Lang 2005). Lang (2005) goes on to suggest that CSAs are inherently organic, which is where Stanford (2006) disagrees. Stanford (2006:182) says that they are one of the most complex markets when she points out that, "in contrast [to the other 5 markets], CSAs require the construction of both ongoing relationships between producers and consumers and a formal organization."

Some of the markets listed above allude to or contribute to more than just the economics of sustainable agriculture, however. Community has also been attributed as beneficial in retaining participants in the alternative agriculture across the US (Guthman 2004; Hinrichs 2000; Stanford 2006; Wilk 2006; Wolf et al. 2005). The next section is going to discuss the potential community benefits that are gleaned from sustainable agriculture by farmers.

**Societal and Community Benefits of Sustainable Agriculture**

Many of the benefits of sustainable agriculture are directly related to the third pillar of sustainability: society. As DeVore (2002) points out, the social benefits of sustainable agriculture seem to be exceptional, sometimes even broadening participation across social lines such as gender and race, and he is supported by many others involved in the field (Allen 1993; Bell 2004; Cone and Myhre 2000; Constance 2008; Hinrichs 2000; Netting 1993; Stanford 2006; Weis 2007; Wilk 2006). When discussing sustainable agriculture, many authors have said that the societal and community building benefits are extensive and often overlooked (Banwell et al. 2006; Cone and Mhyre 2000; DeVore 2002; Stanford 2006). Brian DeVore (2002:113) says the farmer-to-consumer relationship "... provides moral support for the type of farming they are doing as well as feedback directly from eaters on what works and what doesn't." The relationships that are
formed between the farmer and the consumer also help to educate the consumer about food production. This knowledge could be vital for the movement to continue to grow. DeVore (2002:113) goes on to say, "the consumers … learn about the challenges family farmers face in raising safe, ecologically sustainable food. Such information can come in handy when they shop as well as when they vote."

The connections between the farmers and consumers also play an important role in the farmer-to-farmer relationships. DeVore (2002) says that this contact and connection becomes valuable for the farmers who interact with each other at farmers markets and cooperatives. The exposure to other farmers who have methods that are nonconventional can influence conventional farmers to make the switch. DeVore (2002:111) says, "in fact, networking with other farmers is critical to the success of transitioning into sustainable agriculture.” DeVore is suggesting that although it may be the new market that draws farmers into sustainable agriculture, it is the community support and the personal relationships with other farmers and with their consumers that helps to keep them participating in alternative agriculture.

While DeVore (2002) is addressing the benefits of farmers markets, particularly, these benefits have been seen in all of the other forms of sustainable agriculture (Banwell et al. 2006; Lang 2005; Cone and Myhre 2000; Stanford 2006). Much of what DeVore (2002) says about farmers markets’ positive effects on community relationships can be also applied to CSAs, for example (Hinrichs 2000; Lang 2005; Stanford 2006). Traditionally, CSAs have served many functions for individuals within sustainable agricultural communities (Lang 2005). A few reasons that CSAs have attracted participants are: a removal from the system of industrial production methods of
conventional agriculture (Hinrichs 2007), a reaction against cultural homogenization (Wilk 2006), and the ability to consume pesticide-free food (Press and Arnould 2011). As noted before, some authors suggest that CSAs can become embedded in the food culture of the area (Hinrichs 2000; Stanford 2006). In contrast, industrial agriculture’s embeddedness in the food culture of the United States has caused people to be less likely to participate in alternative forms of agriculture (Press and Arnould 2011). Therefore, Hinrichs (2000) suggests that if nonconventional agricultural methods begin to become embedded in the community, then it is more likely to grow and be successful, and thus, attract more participants.

There are social benefits with farm-to-school and farm-to-restaurant programs that can be seen across the United States. Farm-to-school programs can improve local perceptions of the sustainable agricultural community, as these farmers have much more direct community interaction than conventional farmers (Bagdonis et al. 2008). Farm-to-school programs can also encourage the growth of the local sustainable community (Bagdonis et al. 2008). While there are sustainable farmers who are strictly involved in farm-to-school or farm-to-restaurant programs, many of them also access the other markets established above (Bagdonis et al. 2008; Stanford 2006). Some of the farm-to-school movement has also been driven by local governments’ concerns with obesity and health (Bagdonis et al. 2008). As Bagdonis et al. (2008) discuss, accessing local food systems may allow the food served to the students to have more nutritional value. In this case, the government (e.g., a school board) is possibly making assumptions that sustainable agriculturalists produce food that is safer or healthier to consume (Hinrichs 2003).
Another important aspect of farm-to-school agriculture is that it usually involves programs that are just as much school-to-farm as they are farm-to-school. Students visit the farm that their foods come from; the teachers and farmers also often take this opportunity to teach the students about how their food is produced, and the students are sometimes allowed to participate in food production (Bagdonis et al. 2008). These programs can often also be more economically sustainable for the producer than some of the market relationships listed above because they usually involve contracts between the farmer and the partnering institution (i.e., a school or restaurant) that establishes that the restaurant or school is guaranteed to buy a certain amount of farm products on a regular basis. As discussed before with farmers markets and CSAs, many of the same social benefits that DeVore (2008) establishes about sustainable agriculture may also be present with farm-to-school (Bagdonis et al. 2008; Stanford 2006).

Sustainable agricultural methods applied in conventional agricultural settings have been examined in Mississippi (Shoreman and Haenn 2009). However, existing research has not investigated self-identified sustainable farmers or the societal benefits of sustainable agriculture. The next sub-section will examine sustainable agriculture in Mississippi, specifically.

**Sustainable Agriculture in Mississippi**

Mississippi has a deep history of agricultural production (Cobb 1992; Fite 1984; Giesen and Hersey 2010; Lester 2008; MDAC 2012; Shoreman 2009), and Mississippi's residents are still heavily dependent on agricultural production, especially in the Delta (Fite 1984; MDAC 2012; Shoreman and Haenn 2009). Due to the history of Mississippi, which will be discussed in depth below, it is unsurprising that agricultural production is
heavily focused on conventional/industrial methods (Fite 1984). Although the sustainability assessment industry in Mississippi has not grown as much as other places (Guthman 2004), sustainable agricultural methods are beginning to appear (Shoreman 2009).

Shoreman and Haenn (2009) suggest that since the adoption of industrial agricultural techniques and technologies, Mississippians have been very conservative and resistant to change. This conservative attitude of Mississippi farmers is one reason why there has been little employment of sustainable agriculture methods and markets (Shorman 2009). However, Shoreman and Haenn (2009) do demonstrate that there have recently been a few farmers who began employing alternative agricultural methods, but have done so only to increase profits and to avoid government regulation and that they have little or no concern for the environment, consumer health, or social justice. While the farmers in Shoreman and Haenn’s (2009) study are working against the study’s change-resistant model, the researchers argue that farmers are employing a minimal number of alternative agricultural methods to avoid larger changes that would be forced by government regulation if the farmers had done nothing. As they state, “Farmers are, for now, reluctant environmentalists who seek to assure a sustainable and profitable agricultural base by using conservation to forestall external regulation” (Shoreman and Haenn 2009:96). Shoreman and Haenn (2009) have implied with their study that the only employment of sustainable agricultural methods in Mississippi is by conventional farmers motivated by libertarian and economic reasons.

While anthropologists Shoreman and Haenn (2009) have examined conventional agriculturalists employing some sustainable agricultural methods from an economic
standpoint in Mississippi (Shoreman and Haenn 2009), there has not been an anthropological examination of sustainable agriculturalists that includes the other two pillars of sustainability: environment and society. As previously stated, this study aims to examine sustainable agriculture in Mississippi with a focus on determining the economic, environmental, and social motivations of the farmers.

**Conventional Agriculture in the South**

An examination of sustainable agriculture requires that we first must understand its counterpart, and one of the main driving forces in its creation, conventional agriculture. As the parents of the back-to-the-land movement, Scott and Helen Nearing (1954: 133) said, “nutrition is one of the primary factors in determining the health, happiness and usefulness of every human being.” They go on to say, “One of the chief factors that took us out of the city into the country was an awareness of the menace to health arising out of food processing and poisoning and a determination to safeguard ourselves against it” (Nearing and Nearing 1954:133). This section will focus on conventional agriculture, with examples from the Deep South, starting with the mechanization of agriculture after the Great Depression, followed by an example of cotton production in the Deep South. The third sub-section will examine the rise of the synthetic chemicals used in agriculture and demonstrate how a focus on chemicals radically changed food production in Mississippi and the Deep South. The last sub-section will discuss current trends in conventional agriculture in the region. Particular practices, and the motivations behind those practices, will be examined and explained with an emphasis on how they often do not address sustainability.
The goal of this section is to explore and explain conventional agriculture so that sustainable agriculture can be better understood. However, this section will also critique conventional agriculture to highlight the issues sustainable agriculturalists have with conventional agriculture. Although there are many issues to be critiqued when discussing conventional agriculture, it is widely recognized that the vast majority of the global population, North or South, depends on conventional agriculture for their daily caloric intake (Bell 2004; Constance 2010; MacDonald et al. 2013; Schlosser 2001).

**The Great Depression**

October 29th, 1929, also known as Black Tuesday, marked the beginning of what is now known as the Great Depression in the United States. While there is a vast amount of information about how the Great Depression affected the US and the globe, this sub-section focuses on the agricultural sector in the Deep South. Agriculture in the Deep South was already lagging behind the agricultural trends in the other farm-rich portions of the US (Cobb 1992; Fite 1979; Giesen and Hersey 2010). As Gilbert Fite (1979:15) mentions in his review of the agricultural changes after the American Civil War, "In 1930 only 2 percent of the farmers in Georgia and South Carolina were using tractor power compared to 25 percent in Minnesota and 35 percent in Kansas." Mechanization was a trend that was starting to rise in American agriculture during the 1920s, however, the Deep South lacked a need for agricultural mechanization due to the region-wide dependence on sharecropping (Fite 1984). Agricultural historians would undoubtedly say that sharecropping is why the South fell behind in the procurement and application of agricultural technology that was being used across the rest of the United States (Fite 1984).
Sharecropping was a Post-bellum practice where large land owners would lease portions of their land to mostly African-American families who would pay their rent in cash and in a portion of the crop produced each year, usually 50% of gross (Cobb 1992). After the Civil War, the relationship between former owners and slaves sometimes shifted directly to one between lesser and lessee. Sharecroppers were slightly different than tenant farmers, in the sense that, the sharecroppers often did not own much or any of the equipment they used to work the land. This usually translated in to higher rent payments, since they would rent the equipment from the landowner, and thus, higher rates of poverty and inequality in sharecropping relationships than in tenant farming relationships. "Besides the land, the owner provided a house, tools, seed, and sometimes a mule for plowing. The farmer supplied only his labor and that of his family" (Fite 1984:4). These provisions by the landowner were viewed as a social responsibility. The landowners of the South were charged with providing for their “partners” much more than would be expected in a tenant relationship. As one might imagine, however, that was not always the case. Again, we turn to Fite for a pithy remark on the practice:

"[Sharecropping] was a system not far removed from slavery" (Fite 1979:6).

The landowners’ social obligation to their farming partners created a more embedded relationship between the lesser and the lessee (Fite 1984; Marable 1979). With the landowner supplying most things required to farm and live for an entire family, sharecropping jobs initially seemed convenient for both parties. Unfortunately the sharecroppers often did not make enough money to survive any economic crisis, such as a drastic fluctuation in crop prices, or environmental crises, such as the boll weevil or the Great Flood of 1927 (Cobb 1992; Fite 1984; Marable 1979). The sharecropper would
have to borrow money from their landowning partners in response to these crises. This
debt cycle between the sharecropper and landowner created a dependence that trapped the
sharecropper. This dependence, which became embedded across sharecroppers in the
Deep South, made it very difficult for sharecroppers to change professions (Fite 1984;
Marable 1979). Since the sharecroppers were often indebted to the landowner and were
unable to save money, they could not afford the new technology that was being used in
other places in the US for farming, such as tractors and fertilizers (Fite 1984). They
quickly embodied what sharecropping means today: ever-indebted farmers using
antiquated techniques. Oftentimes the only option to escape sharecropping was for the
entire family to uproot and abandon their farm and their debt (Cobb 1992).

Shortly after the beginning of the Great Depression, the numbers of sharecroppers
were racially diverse, but significantly high at almost three quarters of a million. Fite
(1984:113) says, "there were 384,541 black and 336,817 white sharecroppers." He goes
on to say, "only 164,810 black farmers owned their land, a mere 19 percent of the black
operators" (Fite 1984:113). In the eleven Southern states examined by Fite, there were a
total of 2,637,796 farmers in 1930 (Fite 1984). Some quick math shows ~27% of farmers
in the Deep South were sharecroppers at the beginning of the Great Depression. As one
can imagine, the following decade did not bode well for agriculturalists, sharecroppers,
the Deep South, or the rest of the United States.

The Cotton Example

Cotton farmers were already having a tough time during the 1920s due to
overproduction driving prices down followed by the cotton plague of 1920, the boll
weevil (Fite 1984; Walter 1998). Between the 1910’s and 1920’s cotton production
dropped by more than one third (Walter 1998). While there are a number of agricultural laws that had been passed before 1900, such as the creation of the USDA in 1862, the Homestead Act of 1862, the Morrill Acts of 1862 and 1890, and the Hatch Act of 1887, the first two agricultural subsidies to be used in the US were in response to the Great Depression (Folsom 2006; Giesen and Hersey 2010). Although they both had good intentions, they seemed to cause more problems than they fixed, especially in the Deep South. Agricultural subsidies dominate modern conventional agriculture (Bell 2004; Guthman 2004), so a brief history of their inception is be presented below.

Known for laying the groundwork for future New Deal legislation, Herbert Hoover signed the Agricultural Marketing Act of 1929 into law during the first year of his presidency and created the Federal Farm Board, now known as the Farm Credit Administration. The Farm Board created price floors for cotton and wheat by vowing to buy and store as much cotton as Southern farmers could produce at a guaranteed price of 20 cents per pound (Folsom 2006). This price was lower than the market price at the time, but had been calculated to be still slightly profitable for most farmers.

Theoretically, the Farm Board would buy the crops when the prices went down, store the crops, and then sell them later when the market price was acceptable.

However, the price floors seemed more like a way out of the poverty of the Great Depression than it seemed to be a way to support cotton farmers. Many landowners forced their sharecropping partners to begin producing cotton the following year, even if they had no experience or inadequate equipment. Many farmers who owned their own land also switched to producing cotton, or, if they were already producing cotton, vastly increased their acreage (Fite 1984). Such a large amount of cotton was produced that the
market prices for cotton quickly fell below the price floor and the Farm Board was forced to buy much of it. The Farm Board sold much of this cotton on the global market for large losses or gave it away, outright (Folsom 2006).

Franklin Delano Roosevelt (FDR) witnessed the problems in the implementation of the Farm Board’s plan, but still believed that government subsidies could help farmers out of poverty. FDR’s signed the Agricultural Adjustment Act into law in 1933 with the goal of reducing agricultural surplus (Schlesinger 2003). This was classic New Deal legislation that was again intended to stabilize crop prices for farmers. The Act created the Agricultural Adjustment Administration, which was tasked with assessing the total acreage of each major cash crop in the US and then reducing the total acreage to an amount that would cause demand, and thus prices, for those crops to go up. The AAA planned to pay farmers with parity of cotton prices in 1910 to actually take acres of their land out of cotton production (Fite 1984; Folsom 2006).

Unfortunately, the AAA also caused unintended problems for farmers. Many of the landowners would apply to have their land taken out of cotton production but once the money came in from the AAA, the landowners forced the sharecroppers to use the money to pay debts they owed (Fite 1984; Giesen and Hersey 2012). According to their contracts, this money should have been shared equally with their tenants. However, many sharecroppers never had access to the money because the landowners kept it and subtracted it from their total debt (Fite 1984; Giesen and Hersey 2012). By the peak of the Great Depression, sharecroppers needed jobs after abandoning their farms, homes, and debt, while large farm owners needed labor to pick cotton acres they were allotted by
the AAA (Fite 1984). This juxtaposition drove the shift from sharecropping to a transient wage labor system, which is still dominant in conventional agriculture today (Fite 1984).

Once landowners were no longer socially obligated to their labor, just obligated to pay them minimal wages based on the amount of crops the worker planted or harvested, they had more disposable income to invest in technology, such as tractors or fertilizers, which would eventually replace many wage laborers. Washington County, Mississippi was a prime example of the transition to mechanization in the Deep South. Washington County is located on the border of the Mississippi River and its county seat is Greenville, MS. In this county, "the number of tractors increased from 285 to 784 between 1930 and 1935, or 175 percent, while the number of farms declined by 13.9 percent. Total farm population dropped 10.2 percent in the county as the size of farms rose 25.1 percent" (Fite 1984:155). This was not only the beginning of a shift towards mechanization on farms in the Deep South, but it was also one of the catalysts of what's commonly known as the Second Great Migration, when many African-Americans relocated from the Deep South to cities in the Mid-Western and Western U.S. (Fite 1984).

While there was a lot of change happening in the South at this time, it was also a fascinating time. Although they were not widely used, moderately efficient mechanized cotton pickers had finally been invented by the end of World War II and in 1945 a crowd of 2,500 people gathered around the Hopson Brother Plantation outside of Clarksdale, MS on harvest day to witness a wonder of industrial agriculture; the first large cotton crop to be planted, weeded, fertilized, and picked by machines. Gilbert C. Fite describes the scene:
Tractors had furnished the power to prepare the soil for 2,000 acres of cotton, and to plant the crop. Flame weeders, whose intense heat killed the weeds along cotton rows, had been used, and insecticides had been spread from airplanes. Shortly before picking time, airplanes had also showered chemicals over the fields to defoliate the cotton plants. When the large crowd gathered to watch the climax of the year’s production, they saw 7 International Harvester mechanical pickers eat their way through the fields, each harvesting about 1,000 pounds of cotton per hour, as compared to 15 to 20 pounds that a man could pick by hand. To raise that much cotton with tenant farmers and mule power would have required about 130 families, or 600 to 700 people. The Hopsons employed only 40 wage workers. [Fite 1984:169-170]

Although it is true that the Hopson's were employing 40 wage-workers, let's not forget that those jobs were temporary. The employees they used during this harvest were probably only working and paid for a week's worth of work. And while they were paid relatively well, their job was transient (Fite 1984). They were also working more land per worker on average than ever before in the Deep South (Fite 1984).

Overall, agricultural production in Mississippi was strongly affected by the early and mid 20th century. According to the decennial agricultural censuses between the years of 1919 and 1949 the average value of products per farm in Mississippi started at $1,498, reached a low of $413 (second worst in the Deep South), and was back up to $1,442 by 1949 (Fite 1984:237). Agriculture in the American Southeast struggled with the Great Depression, technological adoption and procurement, ownership and labor management,
and natural disasters, but was able to survive and become the industrial machine it is today (Fite 1984). However, the accomplishments of industrial agriculture have only become more streamlined and industrialized since the end of World War II. The current industrial agricultural trends that were derived from the ones discussed in this sub-section will be discussed in the final sub-section, but next let's examine the rise of synthetic chemical usage in American agriculture.

**Synthetic Chemicals**

The subject of early synthetic chemical usage by American farmers often elicits thoughts of Rachel Carson’s *Silent Spring*, a commentary on the rise of DDT use in the 1940s and 1950s (Carson 1962) and the Green Revolution (Gaud 1968). However, the beginning of soil amendments being widely applied to American agricultural systems begins with fertilizers in the 1840s (Sheridan 1979). “The first commercial fertilizer to be widely used in the United States was Peruvian guano, which was found on the arid coastal islands of Peru” (Sheridan 1979:308). Long before the guano deposits were depleted in 1875, industrialists along the Atlantic coast discovered different ways to broaden the niche market that the Peruvian guano had now established (Sheridan 1979). A number of commercial fertilizers being produced for northern and mid-western farmers’ usage, but many Southern farmers were slow to adopt fertilizer application. Commercial fertilizer usage did not become widespread on farms in the Deep South until the 1870s (Sheridan 1979). Farmers in the Deep South couldn’t realistically afford chemical fertilizers until the first fertilizer plant in the Deep South opened in 1859 in Charleston, South Carolina, and began selling to local farmers at affordable prices (Burch 1929). This plant, and many others that soon followed across the Deep South, were using
phosphate rock deposits in the Carolinas and treating them with sulfuric acid to make what was known as superphosphate. Superphosphate was so effective, easy to make, and inexpensive that it was the primary source for phosphorous based fertilizer until 1960, over a century after it was invented (Sheridan 1979).

By the beginning of the Great Depression, farmers in the Deep South were leading the nation in consumption of fertilizers, with only six states (NC, SC, VA, GA, AL, and MS) consuming about half of the fertilizer used in 1930 (Galbraith and Black 1938). These fertilizers were being used mostly to boost production of cotton and tobacco (Galbraith and Black 1938). As the Great Depression began to set in, fertilizer usage began to decrease steadily. Galbraith and Black (1938) suggest, however, that farmers reduced labor and acreage planted each year but would try not to decrease the amount of fertilizer applied per acre. The farmers who were forced to cease fertilizer application were initially worried they had been wasting money on fertilizers because they continued to have relatively high yields the following year or two. Eventually, however, the nutrient surplus they created and were maintaining with annual fertilizer application became depleted, and by 1932 the fertilizer application and cotton and tobacco yields began to drop drastically below previous yearly averages (Galbraith and Black 1938). However, industrial agriculture’s fertilizer habit had already been formed (Fite 1984).

Chemical fertilizers aren’t the only synthetic chemicals that are regularly applied in current day conventional agriculture. When DDT was invented in 1939, the category of synthetic chemicals broadened to include both fertilizers and pesticides (Kinkela 2011). Farmers were already familiar and comfortable with applying synthetic chemicals to increase their yields. After World War II when the Great Depression began to ebb,
synthetic chemicals became another commodity that was no longer out of reach for many farmers. The reliance on synthetic chemicals quickly became an addiction for farmers all across the U.S., and eventually inspired Carson (1962) to publish her fears and asked farmers, and the general public, to question their techniques. Carson had a small audience in the farming community who welcomed the skepticism and criticism, and while her book eventually led to the ban of DDT use in the United States, American agriculture was too heavily dependent on synthetic fertilizers and pesticides to give either of them up.

According to the USDA's Economic Research Service agency, conventional agriculture today uses 22 million tons of fertilizer (MacDonald 2011) and 438.5 thousand tons of active ingredients of pesticides per year (Nehring 2012). As this section has reached the intersection of history and modern applications of conventional agriculture, the final sub-section will discuss the methods and applications of synthetic chemicals, as well as other modern practices.

**Conventional Agricultural Practices**

The previous three sub-sections have demonstrated the inception and development of many methods of conventional agriculture. This foundational history of conventional agriculture is critical in understanding the current practices and motivations of conventional agriculture as a comparison to sustainable agriculture. This sub-section presents methods and processes that are common across industrial agriculture the United States.

Farming in the Deep South today is dominated by the issues discussed above: wage labor, mechanization, government programs, and synthetic chemical application. Admittedly, when you consider that "today most cropland is on farms with at least 1,100
acres, and many farms are 5 and 10 times that size" (MacDonald et al. 2013), it would be physically impossible for anyone to manage a large farm without using all of those methods. Large farms today are almost completely cultivated and harvested by machines, especially crops like corn and wheat that can easily be planted, sprayed, and harvested with machines. Many tractors on large farms are now coordinated by Global Positioning Systems (GPS) (Bell 2004). The GPS allows the tractor to learn the layout of any farm and then is able to steer the tractor and ensure that no row is accidentally passed over twice. These tractors are so large and technologically advanced that they can plant as many as 945 acres per day and that one tractor can plant the largest farms in the U.S. (11,000 acres) within 12 days (MacDonald et al. 2013). As a frame of reference, 11,000 acres is equivalent to approximately 8,320 standard American football fields. This tractor can be operated by one person, and possibly one day, operate itself (Bell 2004). While the goal is not to oversimplify American industrial agriculture, the scale at which industrial agriculture operates is almost unimaginable to the average person. This is also what the average American relies upon for food production.

As well, tractors are enigmatic to the average person, therefore a simple description of how they operate is important to understanding the daily processes of conventional agriculture. Tractors have front end and back end attachments called implements. The front end attachments can be hydraulically powered and are used to push or carry things. Buckets, plows, and forklifts are examples of front end implements. Back end implements are most often attached by a three-point-hitch that can also raise or lower them with hydraulic power. Back end implements also attach to the tractor’s power take-off (PTO), if they are mechanized. For example, to till the soil the three-point-hitch
and PTO can be attached to an implement called a cultivator. The cultivator is pulled behind the tractor and will till the soil and form it into rows when the PTO is engaged. Tillage and row construction are often handled by the same tractor implement, but there are a number of different types of implements.

Seed planting and fertilizer application are also managed with back end implements. After seeding, it's possible for a broadcast seeder implement to be refilled with powdered fertilizer to be spread on top of the seeds. Fertilizers and pesticides should be applied at different times during the crops life cycle, based on the mechanism of action of each chemical. The baseline for most chemical application is sprout emergence, which is when the sprout from the germinated seed emerges from beneath the soil. The broadcast seeder can also be replaced with a spraying implement that can apply liquid fertilizers and pesticides in approximately the same amount of time as planting.

Application of liquid fertilizers is more common post-emergence since they can sometimes be applied at the same time as pesticides (Griffith 2010). To prepare for fertilizer application, farmers can conduct their own soil tests on their land throughout the year. These soil tests help to determine the Nitrogen to Phosphorus to Potassium ratio (N-P-K ratio) needed for their crops to have the highest potential yield. The ratio of fertilizers needed can change from season to season based on the crops being grown in the field and what types of nutrients those crops deplete from the soil. While synthetic chemicals can be applied in a number of ways, they are most often diluted in water and sprayed either by tractor or plane (crop dusters) across their entire crop, sometimes more than once per season. In Mississippi, airplanes are also commonly used for crop-dusting of some pesticides. The liquid application method is beneficial when the farmers are
using pesticides that need to be applied to the surface of the plants, but is wasteful because not all of the chemicals land on the plants and the portion that does can be washed off by rain or above ground irrigation (Kinkela 2011; Sanahuja et al. 2011).

Glyphosate, a topical herbicide, and other herbicides are often sprayed with a tractor or a plane on a field with one of two goals: as pre-emergent or post-emergent weed killers. As a broad-spectrum non-selective herbicide, glyphosate is one of the most widely used herbicides for weed control in agricultural and non-agricultural settings in the world (Grube, et al. 2011; Heap 2014). Oftentimes, post-emergent herbicides are less common because if they kill weeds on contact, they will usually also kill the crops on contact. One of the methods conventional farmers use to combat this problem is to grow and produce genetically modified organisms (GMOs), which are crops that have been genetically modified on a molecular level to have certain properties that are not endemic to that species. One type of GMOs that is often purchased and used by commercial farmers in industrial agriculture is the group of plants made to be resistant to specific herbicides. For example, some soybeans have been genetically modified to be resistant to the herbicide glyphosate (Heap 2014; Holt et al. 2013; Shiva 2000). Glyphosate is a herbicide which inhibits an enzyme called EPSP synthase (Sikorski and Gruys 1997). EPSP synthase is required in a metabolic pathway in plants that produces the aromatic amino acids: phenylalanine, tryptophan, and tyrosine (Sikorski and Gruys 1997). This metabolic pathway is only very rarely found in one other domain in the known biological world, bacteria, so it is often considered safe for application on a large scale (Sikorski and Gruys 1997). If the farmer is growing GMO soybeans that are resistant to glyphosate, the farmer can spray glyphosate on their crop as a post-emergent herbicide at any time.
and only unwanted broadleaf plant growth will be impaired. Even when working with non-GMO crops, glyphosate can be used as a very effective pre-emergent herbicide with little-to-no negative effect on un-emerged plants.

Critiques of chemical application in conventional agriculture have been prevalent since Carson (1962) questioned the impacts and effects of DDT. Recently, however, herbicide resistance in plants, due to the overuse of herbicides has been a concern of biologists and ecologists (Heap 2012, 2014; Holt et al. 2013). Evolved herbicide resistance has recently become an issue of concern for botanists, plant scientists, and ecologists (Holt, et al. 2013). As of 2012, Mississippi has the highest known number of weeds that are known to be resistant to glyphosate, at eight, and is tied in 6th place for the highest number of herbicide resistant weeds in the United States, at 19 species (Heap 2012).

Juxtaposed with the previous section, the modern practices of conventional agricultural production have drastically changed since the days of sharecropping. The technological and methodological advances of conventional agriculture are impressive. However, sustainable farmers have reacted against many of these practices, as they are viewed as unsustainable over a long period of time. The following section will summarize and conclude this chapter.

**Applications**

This chapter has examined a multitude of issues that are pertinent to the discussion of sustainability, sustainable agriculture, conventional agriculture, and the ways in which these issues have developed or affected the Deep South, particularly Mississippi. Defining sustainability, as well as examining the numerous definitions of
sustainability across disciplines, was the first step in demonstrating the triteness of the word, itself. Furthermore, exploring the applications of sustainability on an international scale has been critical in establishing how the concept of sustainability became hackneyed. While sustainability has been established as cliché, this research was framed by the three pillar perspective of sustainability, as established by the United Nations General Assembly World Summit of 2005 (United Nations 2005). Since participants recruited for this research project identified themselves as sustainable agriculturalists, it was assumed that they also have produced independent definitions of sustainability through their employment of alternative agricultural practices. Therefore, no specific definition of sustainable agriculture was used in this study, but instead, practice theory and grounded theory have been applied to explore and ascertain participants’ interpretations of sustainability (Ortner 1984; Strauss and Corbin 1994).

Conventional agriculture has also been discussed in this chapter from a historical perspective to demonstrate how agriculture became what it is today, but also as a critique. Sustainability, and sustainable agriculture, is a response by alternative farmers to the inappropriate usage of resources in industrial agriculture (Guthman 2004). This research project presents established methods of sustainable agriculture being applied by farmers in Mississippi, why the participants use specific methods, and what ideologies motivate them to use sustainable agricultural methods in general.

Shoreman (2009) has examined the application of sustainable practices in conventional agriculture in Mississippi; however, there has not been a focus on smallholders who identify themselves as sustainable farmers. The research conducted in this project was framed by the literature of sustainability and agriculture that is discussed
above and provides a window into the sphere of sustainable agriculture in Mississippi. Exploring sustainable farmers is not a novel concept, as demonstrated above. However, this research project provides the first in-depth anthropological case study of self-identified sustainable farmers and their motivations in Mississippi.
CHAPTER III
RESEARCH METHODS

This research project used social network analysis, participant observation, and semi-structured interviewing, to address the following research questions:

1. Are self-identified sustainable farmers in Mississippi drawn to sustainable agriculture only because they see that there is a market available, or are there social or environmental motivations for their employment of alternative agricultural methods?

2. How are the social networks of the sustainable agriculturalists in Mississippi constructed?

3. Do their social networks create a sense of community that reinforces participation in sustainable farming?

4. Are there specific groups that are being drawn to sustainable agriculture in Mississippi (i.e., young farmers, new farmers, traditional farmers, etc.)?

5. Are the sustainable agriculturalists in Mississippi involved with organizations or institutions that can standardize sustainable agriculture and do these organizations or institutions affect their values and beliefs about sustainable agriculture (i.e., CSA, Certified Organic, Certified Naturally Grown, etc.)?
The roots of this case study lie in the non-profit organization Gaining Ground Sustainability Institute of Mississippi (GGSIM or Gaining Ground). The PI completed an internship with GGSIM during the Spring and Summer of 2012. As a part of the PI’s work with GGSIM, a database was constructed of all known self-identified sustainable or alternative farmers in the state of Mississippi. This database was built from GGSIM’s contacts and localharvest.com, a website for farmers to advertise their products and methods. It contained information about 93 sustainable or alternative farmers, including contact information, methods of accessing markets, methods of production, items produced, and much more. These contacts were used in an attempt to identify and explore the social network of self-identified sustainable farmers in the state. The PI attempted to contact all of the individuals listed in this database for social network analysis.

Participant sampling for this research project was done with the database from GGSIM. In an attempt to get the most complete sample of sustainable and alternative farmers in Mississippi, the PI attempted to contact every member of the database of 93 farmers via phone using the recruitment script in Appendix D. If participants were unavailable via telephone, the PI attempted to contact participants using the internet. E-mails were sent to potential participants using the same recruitment script. If there was no e-mail address in the database for the farmer, or if there was no e-mail response, the PI looked for more information online about the farm and farmer using an internet search engine. From this database of 93 potential participants, four refused participation, five confirmed that the farm had gone out of business, and 56 remained uncontacted. Twenty-eight self-identified sustainable farmers were recruited, which produced a response rate of 30.1%. Many of the potential participants in the database were not contacted or were
ineligible to participate because they had gone out of business or moved to another state. It should also be noted that, during the internship with GGSIM, the PI did have some personal contact with farmers who became research participants, but they were recruited via phone and script as well (Appendix D).

This research was conducted in three major portions, social network analysis, participant observation, and semi-structured interviewing. Twenty-eight self-identified sustainable farmers in Mississippi participated in the first portion of research, social network analysis. This data was collected to obtain a deeper understanding of the relationships between sustainable farmers in Mississippi. After social network data was collected from some participants, the PI began simultaneously collecting data via the second and third portions of research, participant observation and semi-structured interviewing. Social network analysis, participant observation, and semi-structured interviewing all continued simultaneously until data collection was completed.

Participant observation and semi-structured interviews were conducted with the aim of acquiring more detailed data on self-identified sustainable agriculturalists that own or operate agricultural businesses in the state of Mississippi. Farmers who participated in participant observation and semi-structured interviewing were purposively sampled based on information acquired via social network analysis. The selection criteria for participant observation and semi-structured interviews were 1) the participant’s primary method of market access; 2) the participant’s primary type of agricultural products; and 3) whether or not they were regularly producing food in an alternative or sustainable manner. The first criterion was created to ensure the examination of the diversity of sustainable agriculturalists in Mississippi. The PI followed Stanford's (2006:181) delineation of
sustainable farmers listed above in Chapter II, which defines six market groups for sustainable farmers: "(1) farm-to-restaurant; (2) farm-to-school; (3) farmers' markets; (4) cooperatives; (5) value-added products; and (6) community supported agriculture (CSA’s).” These classifications were an important baseline of how participants potentially accessed markets in Mississippi and were adapted to the sample as data was collected (no participants used farm-to-school so that group was eliminated, for example).

The second participant selection criterion was designed to ensure diversity among types of farms the participants operated. Specifically, farmers producing meat only in one group, vegetables only in a second group, and farmers producing meat and vegetables in a third group. This criterion was created because these three types of farms can vary in a number of ways, including equipment, farming methods, and business models. However, since there are a relatively small number of sustainable agriculturalists in the state of Mississippi, this research did not focus on any particular method of production (i.e., organic, certified naturally grown, etc.). Lastly, the third participant selection criterion was established to exclude potential participants who had suspended their farming business or transitioned into conventional agriculture.

As a final note, defining something like sustainable agriculture would be assumed to be easy by many, but as shown above, sustainability and sustainable agriculture have been obtuse subjects which have been difficult to define. For the intents and purposes of this research project none of the above definitions will be used specifically. This research project was designed to examine farmers in Mississippi who identify themselves as sustainable. Because sustainable agriculture as an acknowledged practice in Mississippi
is relatively unstudied (Shoreman 2006), establishing a restrictive definition of sustainable agriculture may have limited the study even more by excluding participants who were just transitioning to or experimenting with sustainable agriculture.

**Social Network Analysis**

Social network analysis has been used by many of the social science disciplines to determine how information moves between individuals (Prell 2012; Scott 2000; Trotter 1999; Wasserman and Faust 1994). It also allows the examination of many important characteristics of personal relationships and demonstration of how well-connected a community is as a whole (Trotter 1999). This method is often applied by anthropologists and sociologists to explore specific groups and how information, ideas, or resources move through that group (Johnson 1994; Prell 2012).

Before the social network analysis research is presented, some theory of social network analysis should be discussed so that the reader has a full understanding of this section. According to social network analysis theory, actors are individuals who are linked together by some form of relationship (Borgatti et al. 2013; Prell 2012). Actor attributes are used to describe an actor’s personal information such as age or gender. Ties, or relations, are how these individuals are connected (i.e., Mark and Steve are brothers). Ego is the actor that the researcher is focusing on and an alter is a person that ego lists as a connection. Lastly there are ego networks and whole networks. Whole networks are often censuses of a particular population (e.g., licensed drivers in the United States) and must be analyzed as a complete unit. This requires every member of the network to participate in the research so that they may report on their relationships with other members of the network (Borgatti et al. 2013; Prell 2012). Ego networks are focused on
the network of one individual, but do not examine the network beyond that specific individual’s knowledge. Ego networks may be nested within whole networks and can be extracted from larger social networks (Borgatti et al. 2013).

During the social network analysis portion of data collection for this research project, the PI attempted to contact every farmer listed in the database from GGSIM through telephone calls with the use of a recruitment script. The script provided the participants with some limited information about the PI, this study, and asked them if they would be interested in participating in the study (Appendix D). If the farmer agreed to participate, a day and time was scheduled when the PI could visit the participant’s farm to conduct the Social Network Analysis Questionnaire (SNAQ). After contacting 37 individuals, 28 agreed to participate in social network analysis and dates were scheduled for each individual. During the scheduled meeting, the PI provided more details about the project to the participant, read the Social Network Questionnaire Informed Consent Form to the participant, asked them to sign it, and then asked each of the questions on the SNAQ (Appendix A). While the on-farm collection of SNAQ data allowed the PI to collect the quantitative data, it also served as a tool to determine if farmers were candidates for the participant observation portion of the study.

Most of the SNAQ meetings were conducted with similar schedules, lasted between 30 minutes to an hour, and included a small tour of the farm. While this tour was not intended to be a part of this phase of the research, the farmers were often excited to have visitors and to show off their workplace and home. All participants were asked the same demographic questions in the SNAQ, including details on their primary market access and types of food they produce. Farmers were also asked to list all of the
individuals they know in Mississippi who also consider themselves sustainable farmers. This single name-generator question created a list of alters. For every alter listed by ego, a set of 15 relational and attributional questions about qualities of and the strength of relationships were asked. For example, Question 10.6 of the SNAQ asked the participant, “How would you describe your relationship with them? (e.g., mother, neighbor, friend, colleague, partner, etc.).” The questions in the SNAQ were designed to determine from whom ego acquires knowledge concerning difficulties that may be obstructing ego’s production, distribution and market access, transportation of goods, and/or consumption. This data was collected with the intent of exploring the construction of the social network of farmers in Mississippi and how information or resources moved amongst the farmers.

Once the SNAQ data was completely collected, the PI used Microsoft Excel and Data Analytics’ UCINET for processing and analyses. These software allowed the PI to analyze and produce graphical, demographic, and relationship information for the participants so that they can be better analyzed and understood as community participants. Specifically, social network analysis addressed the relationships participants have with other farmers, how those relationships are important to the participants, and if their social network provides community support that reinforces participation in sustainable agriculture. This social network data was then used to explore the structure of the community of sustainable farmers in Mississippi. Data analysis processes and results will be discussed in more detail below in Chapter V.

**Participant Observation**

Volunteer working days were designed as participant observation for this study, to ensure that a rapport was built with the farmers and that the PI did not ignore the value of
participation. Participant observation is a method long used by anthropologists to collect data and build relationships with the participants of the study (Bernard 2006; Clifford 1983). While participant observation and ethnography have been widely used and widely critiqued by anthropologists, they have persisted as the most accepted methods of cultural exploration and examination (Bernard 2006; Clifford 1983, 1986; Marcus and Fischer 1986; Wolf 1992). Therefore, this anthropological case study of sustainable farmers in Mississippi applied participant observation to address the research questions regarding participant’s motivations, the social network of the participants, and relationship between their motivations and their social network, i.e., community.

Volunteer working days consisted of the PI spending at least one full day with the participants at their farm, garden, or roadside stand. The vignettes included below in Chapter IV of participant observation are direct accounts of some of the volunteer working days. Purposive sampling was used to ensure that a diverse group of farmers were selected for the participant observation and semi-structured interviewing portions of this research. Participant observation was conducted with 14 of the 28 SNAQ participants and served multiple purposes for this research project: 1) The PI was able to learn about the day-to-day operations of the participant on their farm through firsthand experience. This experience was invaluable in understanding many of the topics the farmers later addressed in semi-structured interviews; 2) While working, the PI conducted unstructured, informal interviews with the participants about their farming practices, relationships with other farmers, life histories, cultivars in production, and their personal views of sustainability and sustainable agriculture; 3) The PI was able to converse with the participants in a way that helped to build a personal relationship with each farmer.
Chapter IV provides a window into the fieldwork and data collection required for this research project. While the vignettes below allow the reader to more effectively understand the research process, they also address the hermeneutic process of this research. James Clifford (1986:485) stated ethnographic writing can only really present “partial truths” when he said, “in cultural studies at least, we can no longer know the whole truth, even claim to approach it.” This research project can only offer what was interpreted by this researcher’s interactions with participants. The inclusion of these vignettes is also intended to give the reader perspective on the PI’s conclusions about the motivations of sustainable farmers in the Deep South.

**Semi-structured Interview**

The PI conducted and audio recorded semi-structured interviews with the same 14 farmers that were purposively selected for participant observation based on the criteria discussed above. The same participants were used for both participant observation and semi-structured interviewing because participant observation allowed the PI to informally interview and build a relationship with the participants before asking more personal questions included in the semi-structured interview schedule. Interviewing allowed the PI to collect specific and standardized data about each farmer’s motivators for participating in alternative agriculture, level of community involvement and reliance, levels of income and expenses, production practices employed, social network(s), and the markets and methods used to sell their produce. The interviews took place in a setting where the farmer was comfortable and where the PI could take notes and set up the recording equipment. Oftentimes this was in the evening after the participant observation and was conducted in the participant’s home or farmhouse. Before each interview began, the PI
read the Semi-Structured Interview Informed Consent Form to the participant. If each farmer agreed to participate and have the interview recorded, they were asked to initial and sign the form. Each interview was conducted along the semi-structured interview schedule (Appendix B). The interviews were audio recorded with the participants’ consent for later transcription.

The data collected in this semi-structured interviewing portion of this research was used to address the research questions focused on the motivations and social network of the self-identified sustainable farmers in Mississippi. All of the participants were given pseudonyms in an attempt to delink the information collected about the participants for this research project. The processes and results of data analysis are presented in the following chapter.

Transcribing and Coding Semi-Structured Interviews

In order to dissect and examine the semi-structured interviews, the PI transcribed each participant’s interview. These transcriptions were created by the PI using Microsoft Word. Once all of the transcriptions were completed, the PI started the coding process by creating a cursory list of themes1, such as: farming methods, motivations, market access, etc. Each interview was uploaded to the qualitative data analysis software, NVIVO, which allowed the PI to highlight and code sections of each interview. Many sections had multiple codes applied to them, depending on the subject matter being discussed by the participants. As the PI coded interviews, many new codes were generated, as grounded theory allowed the PI to identify new themes throughout the interviews.

1 Code list is available upon request.
The coding process was iterative, and after all interviews were coded, they were then re-coded. The re-coding process ensured that all codes generated during the coding process could be applied to transcriptions that were coded before the theme was discovered. Many of the codes and themes were then reorganized to be nested within larger themes. For example, Chapter IV discusses participants’ sustainable agricultural practices. Each of those practices had their own code (e.g., water management), but they were then nested within a larger code of sustainable agricultural practices. NVIVO allowed the PI to do all of this coding, identify repetitive themes, and then extract the data presented below.

While many of the themes extracted from the qualitative data addressed the research questions that framed this project, unexpected themes were also discovered. For example, the last section of this chapter examines participants’ involvement with government agencies that provided financial support to sustainable agriculturalists. Thus, grounded theory allowed the PI to discover important topics to sustainable agriculturalists unknown to the PI while designing the project.
CHAPTER IV

PRODUCTION OF SUSTAINABLE AGRICULTURE IN MISSISSIPPI

In the beginning it was virgin – to the west, along the Big River, the alluvial swamps threaded by black almost motionless bayous and impenetrable with cane and buckvine and cypress and ash and oak and gum; to the east, the hardwood ridges and the prairies where the Appalachian mountains died and buffalo grazed; to the south, the pine barrens and the moss-hung liveoaks and the greater swamps less of earth than water and lurking with alligators and water moccasins, where Louisiana in its time would begin.

-William Faulkner “Mississippi” 1954

This chapter presents the results of qualitative data collected during the 14 working days, one with each participant. Participants for the working day and semi-structured interview were purposively sampled from social network analysis participants. Purposive sampling was used to ensure a broad range of participants in participant observation and semi-structured interviews, based primarily on farm type. Each participant in social network analysis was classified as animal, vegetable, or both animal and vegetable producers. These classifications were established by participants during the SNAQ. Secondarily, participants in semi-structured interviews and participant observation were selected based on their location across the state of Mississippi, as a diverse sample of self-identified farmers was desired. This chapter will outline many of the sustainable practices that are common across alternative agriculturalists that participated in this research project. A farm working day included one or many of the
following activities: harvesting vegetables, feeding chickens, building fences, packing CSA boxes, collecting eggs, herding pigs, planting seeds, spreading compost, mucking out barns, and bushwhacking brush to make paddocks for animals. In an attempt to provide the reader with some contextual imagery of farm life in Mississippi and the production of this research project, this chapter presents vignettes of the farm settings and specific participant observation workdays as experienced by the Principal Investigator. In the interest of reflexivity in research, the narrative sections in this chapter are also intended as personal descriptions of an average field work day.

**Introduction**

This chapter presents the methods and practices employed by sustainable farmers in Mississippi. Self-identified sustainable agriculturalists have made a conscious shift away from conventional agriculture. While there is not motivational consensus across sustainable agriculturalists, there has been widespread agreement that conventional agriculture does not operate sustainably (Bell 2004; Constance 2010; Guthman 2004). In fact, oftentimes sustainable agricultural techniques are a direct reaction against conventional methods and the impacts they have. For example, many sustainable farmers tout that they are “pesticide free” or that they “don’t use outside fertilizers” (Dylan Gold, personal communication 2013). These pronouncements are reactions against synthetic chemicals and the conventional over-application of these chemicals discussed in the previous chapter. While synthetic chemicals are viewed as a requirement for agriculture in conventional farming, chemicals are described as a detriment to agriculture and health by many sustainable farmers (Guthman 2004).
Sustainable farmers’ reactions against synthetic chemical application is just one example of how farmers across Mississippi have produced their own definitions of sustainable agriculture. This chapter not only outlines the regularly used methods of self-identified sustainable farmers in Mississippi, it also demonstrates how these methods are independent productions of objections to conventional agriculture in the United States. Understanding how participants produce their own definitions of sustainability and sustainable agriculture is critical in understanding their motivations to continue to participate in sustainable agriculture, as well as their usage of sustainable agriculture as a rejection of conventional agriculture (Ortner 1984).

Water Management

Many sustainable farmers in Mississippi attempt to rely on rainfall as a water supply for their crops and pastures. Although the annual precipitation average in Mississippi is 54.16 inches per year (US Climate Data 2015), farmers often still say they need to irrigate their crops to keep them healthy. According to a participant in this study, Dylan Gold2, “it only takes 20 inches (of rain) to grow vegetables” (Dylan Gold, personal communication 2013). However, rainfall varies from year to year and can fall short of averages or expectations. Also, summer and fall are the driest times in Mississippi, and it rains an average of \( \frac{3}{4} \)” less in these months, compared to winter and spring (US Climate Data 2015). Therefore, many sustainable vegetable growers do have systems in place for irrigation.

2 All names of people used in this document are pseudonyms created to protect the identity and privacy of the participants in this study.
Drip-tape irrigation is very common across sustainable farmers in Mississippi. Drip-tape is a simple concept, a long hose with very small intermittent holes that allow water to drip out due to pressure when the hose is filled. It’s made from plastic and is sold in rolls of hundreds or thousands of feet, with variations in the hose diameter, size of the holes (often measured in gallons per hour, not diameter), spacing between the holes, and hose wall thickness. All of these variables are assessed by a farmer, depending on the needs of each field they are using for drip-tape irrigation. These hoses are run down the length of a berm (raised portion of a row), connected to a mainline at one end and tied off to hold the pressure of the hose at the other end. When the mainline is turned on, all of the hoses fill with water and slowly drip directly on or into the soil that the plants are being grown.

Drip-tape irrigation is an alternative to conventional agricultural methods that use spraying mechanisms. These sprayers come in many different forms, but a similar concept would be an impact lawn sprinkler or an oscillating sprinkler. The issue that alternative farmers are trying to tackle with drip-tape irrigation is simple. Sprayers and sprinklers lose up to 50% of the water to evaporation, runoff, and inaccuracy, while drip-tape irrigation often loses less than 10% to evaporation and often doesn’t have runoff or inaccuracy (University of California Division of Natural Resources 2015). Unfortunately for some farmers, there is also a drawback to using drip-tape irrigation. It can be very wasteful if any of the drip-tape is damaged. One of the participants in this study told me they had to buy new drip-tape every single year. Saying, “we have these weird rat things that chew through it like crazy. And we tried the slightly thicker stuff cause we thought we’d be able to reuse it. But then that didn’t work” (Charlsie Summers, personal
communication 2013). These pests are most likely field mice, or other small rodents looking for a water supply, although the specifics of the pest were never discovered. Following with their sustainable commitments, however, these participants were uninterested in trying to poison the pests, but did have a few farm cats they were hoping would help manage the rodent population (Charlsie and Leif Summers, personal communication).

Some participants in this study found a way to preserve drip-tapes from year to year, but it still involved generating plastic waste. Plastic mulching can be applied on top of the berm once seeds or seedlings are planted and drip-tape is laid down. This plastic mulching is tightly attached to the surrounding soil and then has holes cut into it for the sprouts or seedlings to grow through. Plastic mulching actually serves multiple purposes, but in terms of water conservation, it does two major things. First, it prevents rodents from getting to the hoses to destroy them. The mulching also traps water that is released from the drip-tape, which decreases the amount of water lost to evaporation even further. Some have suggested that the plastic mulching as much as doubles the amount of time needed between irrigation periods (Ingman 2013). As there are other benefits to plastic mulching, this method will be revisited in further sub-sections.

Some sustainable farmers in Mississippi also use rainbarrel collection. This is usually a simple set up if the farmer already owns a building that has gutters. Roofs of homes, greenhouses, chicken coops, or other buildings can serve as giant rainwater catchment tools with little to no modification. Some farmers use containers that are large enough and collect rainwater over months, while others use smaller containers that must be emptied after a couple major rainfalls, but have the advantage of being mobile. If the
container is elevated and has a faucet at the bottom, the farmer can attach a hose and use pressure generated from gravity to apply the water to nearby crops. One farmer would collect rain over the winter in 50 gallon barrels and store the barrels in his greenhouse as temperature sinks, since water is much more efficient at holding heat than air. In late winter and early spring, seedlings would be planted and kept warm in the greenhouse and watered directly from the barrels in the greenhouse, thus serving multiple purposes.

Starting sprouts in a greenhouse and transplanting can also conserve water and extend the growing season for farmers in Mississippi. It also expands the amount of time and space farmers have to grow things, so in late spring farmers can have their summer crops already started in a greenhouse. Greenhouses and high tunnels or hoop houses have similar functions on a farm, but are slightly different. Greenhouses are permanent structures usually used for starting and growing plants in containers. Figure 1 is a photograph of Elwood Foxborough watering some seedlings inside his greenhouse. Greenhouses conserve water because a lot of water is used to start seeds. Greenhouses trap the moisture within and reduce water that would be lost to evaporation if the seeds were started outside. Oftentimes these plants are transplanted once the season is right or they have reached the right stage of growth.
High tunnels, also called hoop houses because of their design, are semi-permanent structures; however, moving them is not easy or done very often. The frame is often made of multiple semicircular metal tubes. Figure 2 shows a photograph taken from inside of a hoop house. Both names are really descriptors, so as shown in the photo, a hoop house or high tunnel is a semi-circular structure that is 15’ high at its apex and varies in length and width, but is often large enough to drive a bus inside. On top of the metal frame are large sheets of plastic with metal tubes attached at the bottom. This allows for effective temperature control throughout different seasons, since the plastic can be rolled up the sides. The ground is exposed in a high tunnel and usually has rows,
just like any other plot of land, in which crops are permanently planted. High tunnels
serve as water management tools in the same way plastic mulch can; they trap some
moisture within the tunnel. However, the tunnels are much less effective in conserving
water during the summer as the sides must be open during the day to maintain
appropriate temperatures.

Figure 2    Hoophouse
**Vignette - Mosse Creek Acres**

Sidney and Helen Mosse are small farmers in their mid 50’s living on a parcel of land has been in Sidney’s family for generations. Mosse Creek Acres is a small farm on a large parcel of land with at least five structures scattered across the property. The first and most prominent building on the property is their living quarters. The “Old House”, as Sidney refers to it, was originally built by his ancestors as a small house with two rooms, one room for their family and one room with beds for rent for travelers waiting for the nearby train. The home has since been expanded, modified, and modernized and now houses Sidney, Helen, and Helen’s mother. Sidney and Helen welcomed me into their home on the morning of our scheduled work day, which began with moving and cleaning an old window air conditioning unit.

After the unit was reinstalled Sidney took me on a tour of the property. Three of the other structures on the property were used for storage and were somewhat in disrepair. The first one is right across the driveway from the Old House and had mostly equipment and fuel for landscaping: weed eaters, lawn mowers, extra shovels, spades, hoes, and the like. Next we went to a small and old barn surrounded by brush and could just be seen from the back porch of the house. This barn seemed to be either half finished or half torn down. Sidney and Helen used this space for drying and preservation of some of their crops. Garlic plants were tied into braids and hung to completely cover the north wall. Potatoes and squash each had their own old horse stall where there were stored for curing. The third building was a much larger barn that Sidney seemed to visit less often.

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It was a few acres away from the house and was filled mostly antiques or equipment that no longer functioned. Old windows and doors, a tractor that seemed as if it hadn’t moved in a generation, wood and steel support beams, and saw blades so dull they barely had teeth, all had their own areas of the barn.

To get to the final building, and to the farm, Sidney, Helen, and I all piled into their 20 year old pickup truck and drove about 1,000 feet down the road. The pickup was necessary because of Mosse Creek we had to cross, which splits their land with the Old House and other buildings on one side, and the farm and the New House on the remaining ¼ of their property. As we drive up the dirt road that seems to be maintained only by the tires of the pickup going back and forth each day, I began to notice parcels of land to my right that were occupied by rows of soil. Some of these rows were bare and had just been harvested and replanted, while others have corn or okra growing taller than the truck. After about an acre, the rows of crops are left behind and a large and mostly bare area of fenced in land houses a few hundred chickens, squawking and pecking for food. The truck is eventually parked about three acres up the drive right next to the chicken coop. We all get out and they show me their morning chores. We start collecting eggs from the chicken coops and then refilling the water a feed bins scattered on the ground inside and outside the chicken houses. Helen takes the eggs back to the Old House and Sidney decides to show me the New House before we get to harvesting.

What I thought was the back edge of the property because of the tree line and electric fence, turned out to just be the northern edge of the farmland. We walked a quarter of a mile though a hardwood thicket along the ridge of Mosse Creek about six feet down until we came to front porch of the New House. Sidney took me into the half
finished tin roof and cedar building that smelled as if the cedar columns had been milled just the day before. He explained that his first passion was painting houses and making furniture from reclaimed materials. The New House was only partially built into a woodwork shop and Sidney points out the piles of sawdust in the next room and was intentionally left unfinished. Sidney explained that in the previous year they decided to make this their new living quarters and farm house because it’s closer to the parts of land that are in production. They hope to have the house finished and be living in it in the next few years.

Mosse Creek Acres produces primarily vegetables, herbs, and eggs. As we walked back to the production area of the property and away from the New House, Sidney explained the importance of soil building in vegetable production. When we got back to the production area, he handed me a pitch-fork and a shovel. Like most work on a farm, mixing compost will make you break a sweat, to say the least. Sidney unhooked a piece of chicken wire from itself that had been wrapped in a ring about three feet in diameter. This makeshift bin was holding food scraps, culled vegetables, and compostable paper waste for the past few months. To me, it looked like a batch of my own backyard compost that was almost done, but I quickly learned there was much more work remaining. “Composting is all about layering,” he told me, as he pushed up a wheelbarrow of chicken and rabbit manure he collected the day before. He pointed at the 4x4x4 cube of chain-link fencing adjacent to the now freestanding column of food scraps and said, “Now all we need is the layers, like a cake.” First food scraps, second manure, and by the time I was done with those two, Sidney would have grass clippings cut and collected for the final layer. He then hooked his clippings bag up to his lawnmower and
starting pushing down the grass patch between the driveway and the garden and I was off
to making the biggest and most sophisticated mudpie of my life. He came back with the
grass clippings long before I was finished with my two layers so he helped me finish up,
and then dumped all the clippings on top. This went on for at least two or three hours,
until we ran out of food scraps. The bin was about ¾ of the way full and I felt very
accomplished, but Sidney explained that by the time this was ready to spread, it would
only be about one foot of rich black dirt.

After lunch in his living room with Helen, all three of us went out to spend the
afternoon harvesting for the upcoming farmers market and then I conducted the formal
interview with Sidney in the New House. As one of my first few participant observation
sessions, I learned as much about farming as I did about Sidney and his wife. Many of the
things I worked on with him throughout the day were new to me, but there were also
numerous times for me to have informal conversations with him and his wife about their
motivations. Why were they farming? Did they enjoy it? Would they recommend their
methods to other farmers? The answers to these questions, and many others that I was
never trying to answer, were provided to me via their generosity and wisdom.

Pest Management

Pest management presents a somewhat difficult problem since sustainable farmers
often choose not to use synthetic pesticides. There are some farmers who do use Certified
Organic pesticides in some instances, like Neem Oil, for example. Neem oil is
mechanically pressed from the Neem tree (Azadirachta indica), which is native to India
and is also grown in Southeast Asia (Soetaredjo et al. 2008). Neem oil contains a
compounds azadirachtin and nimbin, and is known to have antifungal, antiseptic, and
pesticidal properties, which have made it a very popular naturally-derived organic pesticide (Koul 2004). All of the farmers who participated in this study and reported using the pesticide also reported Neem oil usage to their consumers. Many times those farmers indicated that they would only use those pesticides as a last resort and touted what was often referred to as integrated pest management. This term is exactly what it sounds like; applying mechanical, ecological, and chemical methods to control the insect populations that are trying to feed on their crops (Guthman 2004).

For most sustainable farmers who participated in this study, a major component in integrated pest management was simply crushing the pests with their hands, a type of mechanical pest control, while harvesting and weeding crops. As this researcher learned from experiences, however, this task was far from simple. First the farmer must be capable of correctly identifying the “good” insects and “bad” insects. Pollinators are beneficial insects that are important to farmers across the globe and are often easily identifiable. There are also beneficial insects that consume or destroy pests, without damaging the crops. For example, ladybugs eat aphids and soft-body insects. While one may think identifying a ladybug is simple, to the untrained eye it can easily be confused with a Mexican bean beetle or a spotted cucumber beetle. Both are similar in shape and size to ladybugs, have spotted and hardened wing covers, and are a shade of yellow that is similar to some species of ladybugs. Both of these look-a-like bugs feed on the crops, not on soft-bodied pests like aphids. Thus, it is important for the farmer to be able to identify these pests while in the field and simply crush them between their fingers. While there was a vast amount of information provided by participants about specific species of
beneficial and harmful insects managed with mechanical pest control, they will not be discussed in detail here.

Pests can also be controlled by the plastic mulching discussed above. The plastic mulch covers most of the berm, except for the opening where each plant grows through. Covering the berm prevents many insect species from laying eggs in the soil around the crops. These insect eggs eventually become larvae that feed on stems and roots of the crops. Oftentimes, these larvae are hard to remove mechanically because they spend much of their time underneath the soil. Plastic mulch also prevents the growth of competing plants allows the crops to be the only plants absorbing any nutrient supplements (discussed below) added by the farmer. However, some farmers who participated in this study cared less about weeds than others. Although plastic mulching is often morally conflicting for sustainable farmers due to the waste generated, the benefits to their production capabilities outweigh their negative perceptions of the production of the mulch.

Larvae and harmful worms that live below the soil can also be managed with a natural soil additive. Diatomaceous earth is a Certified Organic soil additive and is actually a natural product that is harmless to most things (Athanassiou et al. 2005). Diatoms are analogous to freshwater phytoplankton, although they can also be found in oceans or wet soil. They are unicellular class of algae that have a characteristic silica based cell wall. Diatomaceous earth is fossilized Diatoms that have been collected and heat treated until dried. When the small sharp fossils come into contact with insects, they damage the insect’s exterior and dehydrate the pest via capillary action. Diatomaceous earth is capable of eliminating many insects, however since it is applied directly to the
soil, it usually is only effective in deterring pests that travel to a plant on the soil, like worms, insect larvae, and slugs.

Intercropping is another technique used by farmers to restrict the pervasiveness of harmful insects and pests throughout their fields. Intercropping is a simple concept which takes advantage of the fact that many pests only like to feed on certain species of plants. Farmers who practice intercropping will, instead of planting an entire plot with one species, plant it with a number of species. Intercropping can be scaled up or down, from variation on a single berm all the way to variation between sections of a plot of land. Some farmers went as far as to plant three or four species on the same berm, alternating between species at each site of planting. This would generate a berm, for example, with the following configuration: tomato, pepper, eggplant, okra, tomato, pepper, and so on. While this is the most varied form of intercropping and is possibly the most effective, it also makes harvest and care much more difficult for the farmer. Many of the farmers who participated in this study and used intercropping were more likely to use a row-by-row method. At this scale there would be a whole row of tomatoes next to a whole row of peppers next to a whole row of eggplant and so on. Even at this scale, intercropping still breaks up the species and lowers the immediate concentration of food for species-specific pests to feed.

Species diversity is another important issue for the farmers who participated in this study. Intercropping takes advantage of species diversity to hinder the proliferation of pests within a plot of land. Many farmers would take this a step further, however, by also planting a number of different varieties of the same species. Not only do some varieties have characteristics that may be more efficient in deterring pests, but they also
provide diversity in produce available for their customers when the farmer gets to the
market. Certain varieties, such as burgundy okra, only affect the visual characteristics of
the fruit, in this case, a brick red okra instead of the traditional green. However, a
Cherokee Purple tomato is going to be dark red, almost black in some parts and will have
very strong and acidic flavors, while a German Gold is going to be yellow and much
sweeter. For more species variation, farmers may also intercrop with flowers to attract
pollinators and other beneficial insects to their crops. Farmers also can plant things that
deter pests like herbs. Dill, fennel, and oregano are known to repel many insects that
would pester other crops and were often intercropped throughout a field.

Erik Gardener, a sustainable farmer who participated in this study, discussed
another type of pests that can be more complicated to identify than insects. Southern
Tomato Blight was an example he used while in the field during participant observation.
He said that the tomato blight is a fungus that spreads across tomato plants and can kill
very quickly. The blight is characteristically identified by a ring of what looks like
cornstarch or baking powder on the base of the stem of the plant. He said the advice he
received from agricultural extension professionals when dealing with the blight is to
immediately dig up the entire plant, roots included, put it in a trash bag, and remove it
from the farm to prevent the fungal spores of the blight from spreading to other plants.
Fortunately during this research project, few farmers mentioned encountering major
problems with fungi that infected crops.

Nutrient Support

As established above, synthetic fertilizers are commonly used in conventional and
industrial agriculture to supplement the soil for growing crops. Alternative farmers in
Mississippi have made the conscious decision to refrain from using these chemicals for a number of reasons, but they still often make attempts to supplement the soil in which their crops are growing. Many farmers will tell you that the practices they use are not new, and some techniques they even learned from their grandparents. However, while the techniques are not novel, many farmers have put their own, or someone else’s, modern spin on it. Composting is an excellent example of a practice that is simple and far from new, but highly beneficial to sustainable farming.

Composting is a very simple process focused on creating nutrient rich soil, which is produced by decomposers like bacteria and worms. Farmers often use containment areas made out of chain-link fencing, chicken wire, or even plastic containers. These containment areas are filled with all types of compostable material waste. The goal is to create an environment where aerobic bacteria can thrive off of the organic waste. Other organisms also serve as composters, such as earthworms and insect larvae. Compost must be turned or aerated somewhat regularly because, as the decomposers consume the waste around them, they also consume all of the oxygen trapped in the soil (Suler and Finstein 1977). Once the oxygen is consumed the aerobic bacteria die off and anaerobic bacteria begin to thrive; however, anaerobes are much slower and more inefficient decomposers than their aerobic counterparts. An effectively managed compost pile is thermophilic. This means that the aerobic bacteria generate heat as a byproduct of decomposition. This heat is trapped within the compost pile and can reach temperatures of up to 170°F (Suler and Finstein 1977). Thermophilic composting also serves as a method of pest control. If temperatures above 135°F are maintained for a consecutive period of 10-15 days, many
weed seeds and plant pathogens are destroyed (Hoitink and Fahy 1986; Larney and Blackshaw 2003).

This researcher was often surprised at the list of items farmers said they would compost. Many things are obvious like corn husks or tomatoes that have been partially eaten by birds. Organic waste and culls always end up in the compost pile if they have no other function. Coffee grounds and filters were also very common across farmers. Some farmers would even pick up batches of coffee grounds from local coffee shops to supplement their compost. Sidney Mosse didn’t even compost the coffee grounds he collected. When planting a new row of vegetables he would dig a hole in the row, put a scoop of his compost, a scoop of coffee grounds, a seed, and then cover it up. His thought process was that coffee was already very broken down from being ground and brewed and did not need to be composted to be an effective nutrient supplement. This saves him time and the labor when it comes time to turn the compost.

Compost can also include animal waste, if there is any available, and the compost pile is managed correctly. Any manure can be added to a compost pile for extra nutrient density. Farmers even said it is possible to compost animal parts like chicken bones and feathers. Any leaf litter that can be found around the farm can also be composted. This includes pine needles, grass clippings, fallen sticks, and rotting wood. Many untreated or lightly treated paper products can also be added to the compost. This includes paper towels, notebook paper, paper bags, and cardboard egg cartons. Even some treated paper products can be composted, as some companies make paper products with a biodegradable lining, which can be broken down by decomposers.
Vermiculture is specific form of composting that has been adopted by some of the sustainable farmers who participated in this project. Vermiculture is the process of composting with a specific focus on worms. Two species of worms, Red Wiggler (*Eisenia fetida*) and Nightcrawlers (*Eisenia hortensis*), are often used, but any type of earthworm will work, according to Erik Gardner. Vermiculture focuses on actually feeding and maintaining the worms as a method of producing worm manure, or compost. Vermiculture is different than traditional composting because the high temperatures produced by thermophilic composting will actually kill the worms, so temperature is not the goal. While compost produced in this way does not use temperature as a tool, worms can actually decompose organic waste into compost much faster than bacteria. Erik Gardener told me that his worms are capable of composting their own weight in waste per day. This means that one pound of healthy worms can produce one pound of compost in a day. Some drawbacks to vermiculture, however, are that it is a more fragile system than thermophilic compost. The worms are much more sensitive and must be handled with care. Special bins are often engineered by farmers so that the worms are contained and cannot escape. However, liquid generated from decomposition must be able to drain from the bin so that the worms do not drown in liquid produced from decomposition. This liquid was collected by the farmers in a second container below and is also used as soil amendment. Erik Gardener called this liquid compost tea. Worms are not easily found in large enough quantities on the common farm to start a vermiculture composting system. When starting vermiculture composting, participants often purchased worms, which were shipped to them. If properly fed and cared for, the established colony can be used to seed new vermiculture composting colonies.
Applying fish emulsion was another very popular method of supplementing the nutrient content of the soil. Fish emulsion is a byproduct of producing things like fish oil for nutritional supplements. It’s a liquid organic fertilizer that provides all of the three major nutrients needed for plant growth (Nitrogen, Phosphorous, and Potassium), as well as micronutrients. Depending on the farmer, this is applied in a number of different ways. One farmer, via a grant from the Natural Resource Conservation Service (NRCS), had the capability of applying fish emulsion via his irrigation system. The NRCS helped Elwood Foxworth pay for the construction of a well and the purchase of a pump, which included a system that allowed liquid supplements to be added to the water applied to the field. Elwood said this was a major time saver, as fish emulsion should be diluted before applying. Other farmers mentioned putting it in a pump-pressurized sprayer and spraying the fish emulsion on the leaves of the plant or on the soil around the base of the plant. Each method has its benefits and drawbacks and farmers have chosen the best assumed method for their farm.

Cover cropping and crop rotation is another very common method of nutrient support that is common with sustainable farmers in Mississippi who participated in this study. This method is a little more time intensive than some of the others discussed in this section and also requires a lot of planning. Farmers explained that different species of plants deplete different nutrients from the soil at varying rates. While there are methods of testing the soil for nutrient balance, farmers would rarely test their soil because it is expensive. They usually had a good understanding of their fields already and would only test if they were seeing serious issues. One of the ways farmers replenished nutrients was with cover cropping. Cover cropping, a method often used during the off season, is the
process of planting a non-cash crop that is effective at adding nutrients to the soil. Legumes, such as cowpeas or vetch, are capable of replenishing bioavailable nitrogen in the soil because they form symbiotic relationships in their root systems with mycorrhizae, a fungus, or rhizobia, a nitrogen fixing bacteria. Nitrogen gas in the atmosphere is fixed by the rhizobia or mycorrhizae and deposited in the soil as ammonia and becomes available for plants to use. Oftentimes, cover crops are allowed to grow to maturity or semi-maturity and then are tilled under the soil so that all of the biomass they have generated will be decomposed and returned to the soil. This process is called green-manuring.

Crop rotation is another important process to soil nutrient management for sustainable farmers. Since different species of plants use nutrients in the soil in various amounts, farmers will often rotate plots of land in two ways. First, from year to year, farmers will rotate the species they plant in different plots of land on their farm. This prevents a particular nutrient from being totally depleted in one area of the farm. Farmers sometimes also rest certain plots of land every 3-5 years. This means that one particular area of the farm will stay out of production for one year. Oftentimes, this rested land will be cover cropped for as long as possible and then those grasses and plants will be plowed under as a green manure. Cover crops, such as legumes, mustards and grasses, are used in a plot being rested in an attempt to replenish as many nutrients as possible and often green-manured at the end of the year.

**Vignette - Foxborough Farms**

I met Elwood near the beginning of this project through my internship with GGSIM. I had heard about him through some other farmers and was surprised by his
youth when we first met. Elwood and Sunday Foxworth of Foxborough Farms have the largest vegetable farm of all the farmers who participated in this project. Although their home and farm stand are a five-minute drive from their farmland, the 30 acre space is worth the drive every morning for Elwood. As a person who did not grow up in a rural or farming environment, I vastly underestimated what 30 acres really looked like. With only about 15 acres in production, there was still so much to do and so many things growing. There was definitely more to do than any one person could handle without at least a tractor.

On the morning of our scheduled workday, I met Elwood around 7am at his farm stand. We began by loading his pickup truck with empty, collapsible harvesting bins, a few other tools, and supplies. It was late summer, and late summer in Mississippi is a unique feeling. I can only describe it as moist and hot, all the time. You begin to sweat (or water condenses on your skin, I’m not sure which) as soon as you step outside, even so early in the morning. As I loaded the last few crates, I realized this would be an amazing day of hard work and experiential learning.

Elwood and Sunday are a young couple whose dream of supporting themselves with a sustainable farm in the heart of conventional farming country was coming true. Supported by a CSA membership of over 100 families, they are working the farm full time and still end every day with more work to be done. Two apprentices, training to someday start a farm of their own, worked with them on a daily basis. And not only did they have a growing CSA and farm family, but their own family had just become a little larger with a young daughter that was only a few months old.
The apprentices took the truck and Elwood hopped in my car to head out to the farm for what turned out to be my hottest day of field research. Elwood handed me a harvesting box and walked me to a long row of small green to red to orange peppers that he described as spicier than jalapenos, not as hot as cayenne peppers, and slightly sweet. My job was to walk down the row and pick the ripe peppers, which he described as more red than orange, until the harvesting basket was mostly full. Elwood picked a few peppers on the first plant to demonstrate, and then left me to finish the rest of the row so he could go do some harvesting of something else. These peppers would go into their upcoming CSA distribution box, along with many other vegetables. Harvesting a row of any vegetable that is an acre long may sound like a monotonous task, but I have learned, and every vegetable farmer I talked to will tell you, it is definitively relaxing and fulfilling. I can only imagine how much more fulfilling it is when you’ve watched that plant go from seed to maturity with your care and supervision.

After spending a few hours with everyone harvesting some vegetables, including tomatoes, sweet and spicy peppers, okra, and sweet potato greens, we headed back over to the farm stand to unload all of the produce. With the produce unloaded and a distribution day for Foxborough Farm coming up soon, we now had boxes to pack. Sunday, Zula (an apprentice), and I were tasked with filling around 40 boxes with produce that had been harvested that morning or the evening before. Sunday showed us how she laid out all of the produce in a row on some long tables. Each of us would start at one end with a box and then she would tell us how many of everything to put in the box. Three Japanese eggplant, four tomatoes, one bunch of sweet potato greens, two onions, two bell peppers, and six or eight of the red peppers I was harvesting earlier that
morning. Sunday explained some of the method to this madness and how it was related to the cost of the produce and the amount that each participant paid for their shares.

Breakfast for lunch is a farm favorite for the Foxworth family and that was next on the agenda. They invited me into their home while Sunday and Elwood cooked a family style quantity of eggs, bacon, and pancakes. After our meal, I had a chance to sit down with just Elwood and talk to him about sustainable farming and really get an idea of why he and Sunday decided to start a farm. The semi-structured interview structure was not something that Elwood seemed very comfortable with, but he answered my questions and provided me with a formal window into his motivations and priorities as a sustainable farmer.

That afternoon was hotter than I imagined. After the semi-structured interview, Elwood and I drove the truck over to a nearby green house where they had been starting seedlings of some fall crops like sweet potatoes and broccoli. Once the truck was loaded with all of the seedlings we met everyone back at the farm. Our job for the afternoon seemed never ending, to be honest. We had one full acre to fertilize, plant, and irrigate and another full acre to fertilize so it could be planted and irrigated the next day. Foxborough Farms pledges to its customers that the food they raise is sustainable and organic whenever possible. While they are not certified organic, Elwood uses organic chicken manure that he buys when he doesn't have compost available. Fortunately for me, this organic chicken manure is processed into pellets that are supposedly much less pungent than fresh chicken manure. While I know that to be true now, at the time I was not convinced. Spreading this manure is a relatively simple process. Fill a five gallon bucket with as much manure as you can carry down your row then walk down your row
and shake the bucket at an angle so that some of the manure falls on the row until you get to the end or your bucket is empty. Elwood had me follow him on the first row so I would get an idea of what concentration of pellets on the ground I should be aiming for. We had help from Elwood's friend and apprentices, but we still spent around an hour fertilizing.

After we were done with that, we had to install the irrigation tubing and connect it to the main irrigation lines Elwood had running along each acre. Working in teams of two, irrigation tubing was laid along each row in the acre. One person would stand at the end of throw and hold the giant roll of tubing while the other person took the end of the tubing and ran it down to the other end of the row. This tubing is designed to have perforations along its entire length and when it fills with water, the water then drips from those perforations. This is a preferred method of irrigation in sustainable agriculture because it is the most direct way to deliver water to the plants. Finally we had to plant the seedlings in each row. Planting was a relatively simple process in which we also worked in pairs. One person would be measuring the distance between plants and making the holes for planting, then their partner would follow behind with the tray of seedlings, placing each seedling in its spot, covering its base with dirt, and packing it down.

This process took most of the afternoon. Although it was littered with a number of water breaks, and we were rewarded with a fresh watermelon at the end, it was hard work that once again taught me so much about farming and so much more about Elwood and his everyday life as a sustainable farmer. Unfortunately we did not have much time to talk while doing most of these tasks, but Elwood was very talkative during our water breaks. This worked out well for me as a researcher because I then had time while I was spreading manure, etc. to think of more things to talk to him about. While it was a hard
day's work, it was rewarding for me as researcher because I got a true first hand perspective of life on this farm, but it was also rewarding for me as a human being. I had a sense of accomplishment at the end of the day and I really felt like I had contributed positively to someone's food, even if that meal was a few months down the road.

**Animal Husbandry**

This chapter has focused on the methods of vegetable producers, but only half of the participants in this study produce vegetables. This section will focus on sustainable practices employed by sustainable animal producers in Mississippi. Animal producers in Mississippi most often raise their animals on grass pastures; therefore, many sustainable animal farmers must focus on sustainable pasture management. Additionally, there is a large amount of perceived benefit in grass-fed or pasture-raised animals. Primarily, producers and consumers alike, see the pasture as the animals’ natural habitat. For consumers especially, this creates a somewhat romanticized perception of a happy animal. Consumers believe this is important because the animal is thought to thrive in a setting that is similar to how it would live and grow in the wild. There are also a number of practical benefits for the farmer and the animal. While some of the concepts listed above can be applied to pasture management in the production of animals, the methods are often modified to fit animal production. For example, rotational grazing is similar to vegetable farming practice of crop rotation, discussed above. Rotational grazing is a technique that allows portions of a pasture to be rested so that biomass that is consumed by the animals can be naturally replenished via ecological succession. Pastures are divided into a number of sections with fences or barriers and animals are grazed on each section for a portion of the year.
There is variation between species, and even an animal’s function, when practicing rotational grazing. For example, chickens being raised for meat are rotationally grazed in small pens that are often square and can range between four feet and 10 feet across and 18 inches and 30 inches tall. However, many farmers will say there is no exact size that is correct. Inside these pens are chickens called broilers (term used to differentiate them from egg layers), watering containers, and supplemental feed containers. Farmers who participated in this study often provided supplemental nutrition to their livestock. While the chickens are capable of eating seeds, grass, insects, etc., they often need some organic/sustainable feed to ensure they are healthy. Depending on the size, there can be anywhere from 20 to 80 broilers in a pen. These pens are often made out of wooden frame and have chicken wire or corrugated tin walls. A portion or the entire top of the pen is removable so the farmer can access the inside without the birds escaping. The bottom of the pen, however, is usually open so the broilers can scratch and peck at the grass and bugs underneath.

The purpose of the pen is two-fold. Primarily, the pen protects the broilers from natural predators. Secondarily, it allows the farmer to control the areas of pasture in which the broilers can graze. Oftentimes, farmers had at least five pens grazing a field at a time. Many animal producers would have the chickens grazing the same field as their cattle or other larger pastured livestock, such as cattle. Grazing animals like this allows for direct application of their waste as fertilizer for the pasture. This method also serves as a method of weed control and pest control for cattle, as the chickens are capable of ingesting different grasses than cattle, as well as parasites that host in cattle but not poultry. Depending on the time of year and the health of the pasture, chickens can be left
in the same area for a week, or have to be moved as often as every other day. Although, this does vary between farmers, depending on the amount of pasture they have available and their concern with pasture management. However, the general rule is that the chickens should be moved well before all of the grass is scratched and picked away. As a note, other small meat animals can be raised in this way, including turkey, ducks, and rabbits.

Chickens that are used primarily for laying eggs, called layers, are also rotationally-grazed by participants. Some farmers in Mississippi do this with what they called chicken tractors. Simply, these are basically large chicken coops constructed on a trailer. The chicken tractor is driven to a spot on the pasture, parked, and left there. Inside of the chicken tractor, which is left open during the day, are a number of roosts where chickens can lay eggs and hide from the sun and predators. While the layers usually lay eggs in the roost, they also sometimes lay them in the pasture, outside of the tractor. Outside of the chicken tractors are watering troughs and feed bins, again used for supplemental nutrition. Around the chicken tractor, a mobile paddock is established with marine battery powered electric fences. These fences are basically three-foot high electrical nets with square holes that can range in size. The fence is erected by the farmer in a mostly rectangular or square pattern around the chicken tractor and connected to a marine battery that is also charged by a small solar panel. Again the fence is multipurpose, keeping chickens in and predators out. The layers are locked into the chicken tractor at night to completely protect them from predators. Once the farmer is ready to rotate the layers to another portion of pasture, they are loaded into the tractor, locked in, and driven to the new paddock. The fences are disconnected from the battery,
uprooted, and rolled up so they can be moved to the new location. If the tractor is just being moved one paddock over, one side of the fence is left erected, while the other three sides are moved around the adjacent paddock. It is also worth noting that other birds can be raised in similar manner, including turkeys and ducks.

Ruminators are also rotationally grazed by some sustainable farmers in Mississippi. This includes goats, sheep, and cattle. Rotational grazing is slightly different for these larger animals. Farmers set up a number of paddocks across their pasture. Paddocks are just subdivisions of the pasture which are fenced off, sometimes with electrical fencing. The electrical fencing keeps the cattle in and helps keep predators of smaller ruminates out, but is not completely effective. Depending on the size of the herd, size of the paddock, number of paddocks available, and type of ruminator, these animals will be left in a paddock for varying amounts of time. This is usually calculated by the farmer using a stocking density calculation that accounts for how much edible biomass the pasture produces over a particular period of time. This will inform the farmer of how many animals can be supported on the pasture. Watering is also an issue, but if water is not available naturally or man-made via a pond or lake, farmers provide watering via large containers that are rain filled and/or manually filled with a hose.

Some of the farmers who participated in this study also had a number of herd dogs that would live in the pasture with the ruminators. This is usually only needed for the smaller ruminators, as they can be preyed upon by large predators such as coyotes and wild dogs. The dogs usually stick with one herd and watch over them, day and night. They are also useful for herding the ruminators when they need to be moved from one paddock or pasture to another.
Pigs are capable of being rotationally grazed, as well, although not often through pastures. Natural habitat for pigs is in wooded areas. Brightway Farms was the only pair of farmers who participated in this study who raised pigs rotationally through wooded areas on their farm. This was done with similar rotational ideals as with the other species listed above, but adapted to a wooded area. The forest is broken into paddocks by the farmer ahead of time and fenced off with shin high electrical fencing. This researcher will never forget the correct height of a pig electrical fence due to being shocked by one during participant observation. The fences do not have to be very high because the pigs are not capable of climbing over them. Again, in these paddocks watering troughs and feed bins are placed for supplemental nutrition. A forest sustainably managed by pigs looks like no forest floor one has ever seen. There is no brush or bush or grass or much of anything on the forest floor. The pigs are very good at eating and destroying much of the low lying foliage in the forest. While rotating the pigs, the rest of the paddocks are resting and regenerating biomass in preparation for the next rotation.

Summary

This chapter has demonstrated the agricultural practices of sustainable farmers in Mississippi who participated in this research project. Although definitions are usually presented in words, this chapter has also demonstrated how participants define sustainable agriculture through their actions. This chapter clarified the definition of sustainable agriculture used by self-identified sustainable farmers in Mississippi from the ambiguity established above by examining the specific methods these farmers use to produce food.
While no specific definitions were established, the theme, produced through the application of grounded theory and practice theory, is that participants focused on creating systems that used less energy and inputs (Ortner 1984; Strauss and Corbin 1994). Participants’ methods also often focused on integrating systems so that they worked together, as demonstrated above in multiple sections. Overall, participants produced sustainable agriculture in their own ways, independent of each other. Many participants also discussed sharing ideas and methods with other sustainable farmers, discussed in the next chapter, which focuses on the data analysis of participant observation, semi-structured interviews, and social network analysis.
CHAPTER V
DATA ANALYSIS & RESULTS

In this chapter a description of the sample is presented first to produce an in-depth understanding of the participants. The sample description section is also used to address the research question designed to investigate if specific demographics are participating in sustainable agriculture in Mississippi. Social network and quantitative analysis follows the sample description. Social network data was compiled to generate a network map of the participants in this study. As well, a focus on the strength of weak ties between participants is presented. Social network data and analysis is used to address the research questions presented above that focus on the social networks of the participants as well as questions regarding community strength and structure. Social network analysis is followed by qualitative data analysis. The qualitative data analysis section combines information gathered during participant observation and semi-structured interviews to address the research questions presented above. The results of qualitative data analysis are used to address the research questions focused on determining participants’ motivations for participating in sustainable agriculture and also discuss participants’ use of sustainable agriculture to react against conventional agriculture. Qualitative and quantitative analysis was conducted by the PI after all data had been collected, coded, and compiled.
Qualitative data analysis was conducted by the PI using the iterative process of grounded-theory (Strauss and Corbin 1994). In this methodology the PI collected qualitative data and then examined it to extract themes that were then fit into an already existing theoretical perspective (Bernard 2006; Strauss and Corbin 1994). In this case study, participants identified with the sustainability and sustainable agricultural theoretical perspectives via practice theory, as discussed above. All of the interviews were transcribed by the PI and then imported into NVIVO to code the themes of the data that was collected.

Social network analysis is an important method used by social scientists to investigate how information is shared within a group (Hanneman and Riddle 2005; Prell 2012). The PI was trained to use social network analysis software at a workshop at Society for Applied Anthropology’s annual meetings in 2013. The social network data analysis was conducted using UCINET and NetDraw (social network analysis software designed by Analytic Technology). UCINET allowed the PI to input the nodes, the ties between the nodes, and attributional data associated with each node into the software and then analyze that data to examine how the social network is constructed. NetDraw allowed the PI to produce a graphical representation of the social network data analyzed by UCINET.

**Sample Description**

Some categories included in this section are specific to farmers in this study, such as the primary market each participant accesses. While averages can be useful tools, due to a small sample size, there are other analyses of demographic data presented. Table 1 displays the demographic information of the primary operator of all the participants in the
research. In addition, this work provides insight into the fourth research question outlined in Chapter I; are specific demographic groups participating in sustainable agriculture in Mississippi?

Table 1  
Participant Data

<table>
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<tr>
<th>Case ID</th>
<th>Age</th>
<th>Sex</th>
<th>Education</th>
<th>Marital Status</th>
<th>Years Farming</th>
<th>Marketing</th>
<th>Farm Type</th>
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<td>Married</td>
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<td>FM</td>
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<td>Plants and Eggs</td>
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<td>FTR</td>
<td>Animals</td>
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Table 1 shows that there is variation in most of the demographic categories of farmers participating in this study. Participants have an educational background that ranges from completion of high school to completion of graduate school. There is also a broad range in length of farm operation from less than one year to 30 years. However, the marital status of participants is almost uniform, which is something that is common across farming, sustainable or not (Bell 2004; Hoppe 2014).

Table 2 presents a statistical summary of demographic data. The average age of farmers participating in this study was 48.4, and the median age of 52.2. This is also indicative of a sample that is skewed towards individuals that are in the latter half of their lives. The mode of the age of participants, at 31, indicates that there may be a surge of younger farmers starting sustainable or alternative farms in Mississippi. To support the idea that younger farmers are newer to farming, Table 3 explores the relationship between age and number of years farming.

Table 2  Statistical Summary of Participants

<table>
<thead>
<tr>
<th>Age</th>
<th>Years Farming</th>
</tr>
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<tr>
<td>Mean</td>
<td>48.4</td>
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<tr>
<td>Median</td>
<td>52.2</td>
</tr>
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<td>Mode</td>
<td>31</td>
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Table 3 compares the farming period of younger farmers to the period of older farmers. Participants were separated into two groups, with participants under the age of 46 in the younger group and participants over the age of 45 in the older group. These age groups were created based on the age categories used in Table 5, below. The average age of each group is presented, as well as the average number years farming of each group.
Participants who were 46 years old and older have been farming for 8.4 years on average, while participants under the age of 46 have been farming for only 3.4 years. To ensure statistical significance, a two-tailed student’s t-test resulted in a p-value < 0.001. This p-value indicates that the difference in number of years farming between young and old farmers statistically significant at the 99.9% level.

Table 3     Average Years Farming: Under 45 vs. Over 45

<table>
<thead>
<tr>
<th></th>
<th>Average Age</th>
<th>Average Years Farming</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmers 45 and Younger</td>
<td>33.2</td>
<td>3.4</td>
</tr>
<tr>
<td>Farmers 46 and Older</td>
<td>56.8</td>
<td>8.4</td>
</tr>
</tbody>
</table>

A count of the farmers between the ages of 25 and 45, which can be seen in Table 5, shows that the number of younger participants is remarkable. Ten out of 28 farmers, or 35.7%, are below the age of 46. In a study examining farmer motivations it is important to note that the sample indicates that young farmers are an important demographic who are more likely to be new to sustainable agriculture. While there may be a surge of young farmers starting new sustainable farms, 60.7% of participants in this study fall within the ages of 46 and 65, indicating that older farmers are also a critical group of sustainable farmers in Mississippi. Some of the young farmers reported having advantages to starting a sustainable farm early in life. Wilmer told me that he knows he has advantages many other sustainable farmers may not. During our interview, Wilmer said to me, “I have received every level of support from my parents. I’m just so lucky and grateful to have them” (Wilmer Hegewood, personal communication 2014). Wilmer’s family has a heritage of family farming that goes back over 140 years in the same area of Mississippi. That family history was instilled in Wilmer in many ways. He worked for his dad for
most of his childhood, “My dad was a conventional farmer. I wouldn’t have considered myself a farmer. I was just a kid, but I was working on a conventional farm” (Wilmer Hegewood, personal communication 2014). And while Wilmer’s parents never wanted him to go into farming, the resources he has by running a small sustainable farm on family land with family resources are vast. He told me,

I’m very lucky to have that and I feel like not many people doing this local, sustainable thing have like, a front end loader that can move 3 yards of dirt at a time, you know? You saw that thing today. And tons of tractors and, you know, he’s been farming his whole life, and so he’s got relationships with every farmer around here that can get any type of product or equipment or anything that we need. [Wilmer Hegewood, personal communication 2014]

There were also older farmers who did not have any prior experience with agricultural production but became interested in agriculture later in life. For example, Saul Rain told me while we were mulching some rows with leaves on his farm that he was a car salesman before he decided to become a sustainable farmer. While he wasn’t specific about why he got out of selling cars, it was clear that it was a tough time for him and his family. And while he and his wife Gwen had experience raising animals and vegetables for themselves as a hobby, neither of them had agricultural experience. Saul told me, “God put us here to tend this Earth, to maintain this Earth. He said go and subdue it, but he didn’t say go and destroy it. And so it’s kind of our small part that we can do in trying to do what I think we were supposed to do in the beginning and we failed” (Saul Rain, personal communication 2014).
Another category of demographic information is the amount of time that participants have been operating their farming business (see Table 1 and Table 2). For the purposes of this research, farming businesses that are five years old or less will be considered new farms. This is based on a standard business model of a five-year return on investment. Table 1 shows variation in the period of farm operation, while Table 2 shows that the mean period participants have been operating their sustainable farm business is slightly above seven years. This suggests that, on average, sustainable farmers in Mississippi are not new to operating a sustainable farm. However, the mode of four years also supports the surge of new, young farmers discussed above.

Many of the demographic variables are not quantities, but qualities and thus cannot have means or medians. However, they do have frequencies and thus, are included in the table so that their mathematical modes can be presented (Table 4). The vast majority of the participants in this study are married. Many also have a college education. The most common method of market access was through a farmers market, and the most common type of farmer who participated was strictly raising animals.

Table 4: Mathematical Mode of Qualitative Variables

<table>
<thead>
<tr>
<th>Mode</th>
<th>Marital Status</th>
<th>Education</th>
<th>Market</th>
<th>Farm Type</th>
<th>Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Married</td>
<td>Bachelors</td>
<td>Farmers Market</td>
<td>Animals</td>
<td>Male</td>
</tr>
</tbody>
</table>

A noteworthy variable is education (Table 4 and Table 5). Historically, the trend of farmers receiving a traditional high school or college education has varied (Bell 2004). Although the current generation of young farmers in a conventional setting are more likely to acquire a bachelors degree before entering the agricultural profession than their parents were (Ilg 1995), educational attainment in conventional agriculture is still
relatively low compared to other professions (Hoppe 2014; Ilg 1995; Lockard and Wolf 2012). Conventional farm operator jobs almost never require more than a high school diploma for qualification (Lockard and Wolf 2012). In 2014, 20.7% of conventional farm operators had completed a college education (Hoppe 2014).

Meanwhile, Table 5 shows that over half of the participants in this study have bachelor’s degrees (61%, 17 of 28) and over a quarter of those participants have postgraduate degrees (29%, 8 of 28). Informal conversation during participant observation determined that very few of the participants had degrees with an agricultural focus. This means that, while many of the farmers who participated in this study attended college in some manner, few of them intended on becoming farmers when they started, or even by the time they finished, their formal education. Examining what motivated participants to become sustainable farmers proves to be more pertinent, considering the fact that the majority of participants have non-agricultural college or graduate level educations.

Continuing with important demographic data from Table 5, almost all of the participants in this study are married or partnered. Table 5 shows that only 3.5% (1 of 28) of participants listed themselves as single. This time, sustainable and conventional farmers are very similar. While the statistics are not available for marriage in conventional farming, there are numbers listed by the USDA for family farms in the United States. USDA Economic Research Service (ERS) defines a family farm as, "those whose principal operator and people related to the principal operator by blood or marriage own most of the farm business" (MacDonald 2014). Looking at the demographic data of conventional farmers, 97.6% are considered family farms (MacDonald 2014). Farming is
often thought of as an occupation for an entire family, or at least for more than one individual to share the emotional and labor burdens. While there are individuals in this study who are not partnered in some way, they are definitely the outliers. It is also important to note that the participants who are no longer, or have never been, married have other family, employees, and/or apprentices, they can rely on for support or help with the farm work.

Table 5  Distribution of Sample by Variable

<table>
<thead>
<tr>
<th>Personal Variables</th>
<th>Farm Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>n %</td>
<td>n %</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td><strong>Market Access</strong></td>
</tr>
<tr>
<td>Male</td>
<td>Male</td>
</tr>
<tr>
<td>17 61%</td>
<td>Farm to Restaurant 4 14%</td>
</tr>
<tr>
<td>Female</td>
<td>Female</td>
</tr>
<tr>
<td>11 39%</td>
<td>Farm to School 0 0%</td>
</tr>
<tr>
<td><strong>Age Range</strong></td>
<td><strong>Cooperative</strong></td>
</tr>
<tr>
<td>25-35 7 25%</td>
<td>Cooperative 3 11%</td>
</tr>
<tr>
<td>36-45 3 11%</td>
<td>Farmers Market 10 36%</td>
</tr>
<tr>
<td>46-55 8 29%</td>
<td>Value Added 1 4%</td>
</tr>
<tr>
<td>56-65 9 32%</td>
<td>CSA 6 21%</td>
</tr>
<tr>
<td>66-75 1 4%</td>
<td>On Farm Sales 4 14%</td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td><strong>Plants</strong></td>
</tr>
<tr>
<td>Single</td>
<td>Single</td>
</tr>
<tr>
<td>1 4%</td>
<td>Plants 6 21%</td>
</tr>
<tr>
<td>Married</td>
<td>Married</td>
</tr>
<tr>
<td>22 79%</td>
<td>Plants and Eggs 6 21%</td>
</tr>
<tr>
<td>Partnered</td>
<td>Partnered</td>
</tr>
<tr>
<td>3 11%</td>
<td>Animals 11 39%</td>
</tr>
<tr>
<td>Widowed</td>
<td>Widowed</td>
</tr>
<tr>
<td>1 4%</td>
<td>All/Both 5 18%</td>
</tr>
<tr>
<td>Separated</td>
<td>Separated</td>
</tr>
<tr>
<td>1 4%</td>
<td></td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td><strong>Years Farming</strong></td>
</tr>
<tr>
<td>No College</td>
<td>No College</td>
</tr>
<tr>
<td>3 11%</td>
<td>0-4 13 46%</td>
</tr>
<tr>
<td>Some College</td>
<td>Some College</td>
</tr>
<tr>
<td>6 21%</td>
<td>5-9 7 25%</td>
</tr>
<tr>
<td>Associates</td>
<td>Associates</td>
</tr>
<tr>
<td>2 7%</td>
<td>10-14 5 18%</td>
</tr>
<tr>
<td>Bachelors</td>
<td>Bachelors</td>
</tr>
<tr>
<td>9 32%</td>
<td>15-20 3 11%</td>
</tr>
<tr>
<td>Graduate</td>
<td>Graduate</td>
</tr>
<tr>
<td>8 29%</td>
<td></td>
</tr>
</tbody>
</table>
One demographic category that is not addressed in the above tables or this section is race. Data on this topic were not presented in this section because none of the questions in the SNAQ or the semi-structured interview asked participants to identify their race. Since data were not directly collected concerning race, the racial distribution of participants in the SNAQ cannot be addressed here. However, it was noted that 2 of 14 (14%) individuals who participated in the semi-structured interviews were non-white. When looking at the state-wide racial demographics, the United States Census Bureau reports that 40.3% of Mississippi residents are non-white (USCB 2014). This suggests that while there is a very small percentage of participants in this study who may identify themselves as non-white, there is a much larger percentage of residents in Mississippi who are non-white.

Lastly, to have an understanding of the geographic scope and coverage of this study, data regarding the locations of farms in the state of Mississippi is presented below in Figure 3 and Figure 4. Before research began, a Google Earth map was constructed with points that corresponded with the location of each of the 93 potential participant’s farm, displayed in Figure 3. This map was used by the PI to simplify contacting and traveling for the SNAQ portion of research. After data collection was completed, Google Maps was used to create an atlas-style map for presentation purposes. Figure 4 shows the final map and includes points for all 28 participants in this research project.
Figure 3   Map of Potential Participants
This section has described the participants in this research project and addressed some of the research questions that this research project was designed around. As well, the sample description provides a foundation for understanding the implications of the following quantitative and qualitative analyses. The following section focuses on the analysis of social network data.
Social Network Analysis

In this section, an analysis of the social network data collected with the SNAQ is described and presented. This data is used to address research question 2, “how are the social networks of the sustainable agriculturalists in Mississippi constructed?” and research question 3, “do their social networks create a sense of community that reinforces participation in sustainable farming?” As well, this section examines the strength of weak ties of participants, which is explained in detail below.

As mentioned above, social network analysis is a method of examining a group of connected individuals and attempting to decipher how those individuals are related and how information within that group is trafficked. This section is a numeric and descriptive window into the social networks of farmers who participated in this study. Figure 4 displays a map of the whole network of participants in this study. This map was generated with NetDraw, which used data from UCINet 6.0. The information presented graphically in Figure 4 is drawn from questions 8b and 9 of the SNAQ (Appendix A). Question 8b of the SNAQ asked participants, “Choose any of the following categories of things you produce and sell: vegetables, fruit, meat, eggs, dairy products, value-added goods, flowers, herbs, nuts, grains, other (list).” Question 9 of the SNAQ asked participants, “Please list all of the farmers you know that would also consider themselves sustainable farmers.” Figure 4 is a non-valued, undirected, network level, tie graph with an ego attribute displayed by color. This means that all participants, and any person listed by a participant, are displayed on this graph. Nodes are linked together by ties if a participant indicated knowing another person. The nodes are colored based on farm type,
with green being vegetables only, yellow being vegetables and eggs only, orange being vegetables and animals, and red being only animal farmers.

NetDraw can automatically arrange nodes using a configuration called spring-embedding. This is a repetitive process where the program arranges nodes multiple times until nodes that are highly tied are placed together and others are placed further away. This arrangement is arbitrary, but was used initially in the generation of this graph. The PI then used a drag-and-drop method to make the graph easier to display and interpret. For example, the three outlier networks in the bottom left corner were moved together, instead of scattered across the graph.

Figure 4 graphically presents a large amount of descriptive information regarding the network that was examined in this study. As one can see, there are actually four groups. There is the main group that is moderately well connected. There are also three small independent ego networks where, in each case, the participant listed alters they knew, but no other participant listed as an alter. These three isolated outlier groups indicate that the whole network of sustainable farmers was not totally accessed by the PI in this study. Another interesting portion of the graph is the branch in the top left of Figure 4, which is only one tie away from being an isolate. Network analysis theory suggests that single tie connecting two separate groups creates a bottleneck of information and resources, which could isolate one portion of the network from the rest of the group. The smaller portion of the network connected to the rest of the group by one tie is known as a pendant, and the individual linking the two groups is known as the broker in social network analysis (Borgatti et al. 2013; Prell 2011). The pendant would
behave as if it were an isolated network if the broker chose not to relay information or resources from one side of the network to the other.

There is also a clearly recognizable group in the center of the Network Map displayed in Figure 4. A number of individuals are well connected and interconnected. One may also notice that this group is diverse across animal and vegetable production. This suggests that sustainable farmers in Mississippi find value in having connections that are not solely based on the products they produce. While not displayed in this figure, it is also notable that these individuals do not all live in the same town or even use the same primary forms of market access. This indicates that these are farmers who are connected, most likely through GGSIM, due to their mutual interest in producing agricultural products with methods that are alternative to conventional, industrial agriculture. Figure 4 demonstrates how the network is constructed, and the number of ties in the central portion of the network suggests that the community that GGSIM is attempting to foster, may reinforce participation in sustainable agriculture, as many of these farmers are interconnected.

In terms of social networks, the connectedness, or cohesion, of participants is measured most simply by an analysis of tie density (Borgatti et al. 2013). Network density in social network analysis is a simple method of analysis and can be measured with UCINET. Density analysis is a process where the total number of actual ties over the total number of possible ties generates a ratio of actual to possible ties. Density analysis is most often used in comparing two or more networks to each other (Borgatti et al. 2013). The mathematical density of this network will be explained and discussed in the
following subsection. However, in looking at Figure 4 some general assessments about density can be made.

The central portion of the network is very dense, or rather, the number of actual ties is very close to the total number of possible ties. However, when examining the entire graph, the density would drop drastically, even if the few outlier sub-networks were excluded. The density of the outer portions of the network actually looks inverse to the density of the inner group. There are a large number of participants who appear to be brokers to at least one person, and sometimes multiple participants. These outer individuals are much less likely to receive information that is being shared with the group in the middle, especially if they are more than one step from the middle like the group in the bottom left corner, for example.

The density of ties in the inner group suggests that stronger networks, ones that are better connected, have a larger support system for information, resources. Borgatti et al. (2013) say that stronger networks continue to reinforce themselves, as individuals within the network create new connections with other members of their network. It is possible that these connections are encouraging continued participation in the sustainable agricultural community.
Social Network Analysis - The Strength of Weak Ties

In an attempt to thoroughly examine the social network data collected for this research project, PI explored alternative ways to apply network analysis to the data. Tie analysis, looking at an ego and asking them to describe their relationship with each alter they list, is often conducted within social network analysis. This section discusses how the ties analysis was applied to this research and the results that analysis produced.

The third research question in this project says, “Do their social networks create a sense of community that reinforces participation in sustainable farming?” Research question three was designed to determine if social networks foster the development of community within sustainable agriculturalists in Mississippi. The focus in this section is specifically on the strength of weak ties from participants to their alters. Since the research sample for this project does not capture the entirety of the community of sustainable farmers in the state, it is important to examine these individuals and all of their relationships, not necessarily the strongest ones, with an emphasis on how they access their own communities of sustainable farmers. In less obtuse terms, access to knowledge and advice from other farmers may not only be important, but may be more important than the farmers themselves realize. Therefore, the goal in this section is to determine if there is a potential difference in the perception of importance of ties to alters, as rated on a Likert scale by participants, and the actual importance of those ties to alters, based on participants’ reports of receiving advice, information, or resources from these same alters.

Directed and valued ties are ties that connect from person A to person B (but not necessarily from person B to person A) and have values associated with the strength or
importance of those ties. When examining directed and valued ties, social network analysis theory generally suggests that weak ties are less important and reliable than strong ties (Borgatti et al. 2013; Prell 2011). Network analysis most often focuses on the individuals that ego identifies as important or strong. While the qualitative data analysis portion of this research below examines some of the strong relationships participants have with their alters, it is also important to consider the strength, or importance, of weak ties. Network analysis theory suggests that strong ties are ones that participants would discuss at length during the semi-structured interviewing process (Borgatti et al. 2013). However, Mark Granovetter (1973) suggests that when asked to place a value on their relationship to an alter, ego may think and say that it is weak, but may actually rely on that alter for information or resources. He says, “those to whom we are weakly tied are more likely to move in circles different from our own and will thus have access to information different from that which we receive” (Granovetter 1973:1371). This is not to suggest that the participant is intentionally deceiving the researcher, but that ego is defining the relationship as weak or unimportant in relation to their other relationships. This may seem unclear now so let us look at a particular example for clarification.

Rosaline Evans is primarily a sustainable poultry farmer who had received an NRCS grant to have a high tunnel built on her farm a month or so before participant observation. Rosaline had been raising chickens, ducks, turkeys, and a few other species for eggs and meat for five years and this was her first season experimenting with producing vegetables. She met Charlsie and Leif Summers at a regional farmers market and mentioned that they saw each other a few times a year. From my interviews with both participants, I knew that the regional market that they met at is 2.5 hours from
Rosaline and 1 hour away from Charlsie and Leif, and neither group was attending the market regularly at the time, so distance was probably the cause of not seeing each other very often. Rosaline (personal communication, 2013) said, since Leif and Charlsie raise chickens, as well as vegetables in a high tunnel, she mentioned thinking about getting the new high tunnel and asked them for advice on growing vegetables. She reported that they were encouraging and helpful and gave her advice on what to grow. The next time she saw them, Rosaline had gotten the grant for the high tunnel from the NRCS and asked them for more specific advice about growing vegetables in a high tunnel. However, when I later asked her about the importance of her relationship with Charlsie and Leif (Question 10.10) on the SNAQ (Appendix A) she rated it as a 1 out of 5, or very unimportant.

This is an excellent example of a weak tie that actually displays a level of strength and importance to the farmer. Rosaline, without context, rates her relationship with Leif and Charlsie as very unimportant, but when later asked if she has ever asked them for advice she said that she had. When she was asked to describe the conversation and topics that were discussed, it seems to the researcher that their relationship is actually valuable to Rosaline because of the information and advice she is receiving from a tie that would be traditionally defined as weak by social network analysis.

These types of relationships are examined in the following subsection. In order to examine the importance of these traditionally weak relationships, the researcher has chosen to borrow some techniques from a few different subfields of anthropology and sociology. Social network analysis, specifically Granovetter’s (1973) “Strength of Weak Ties” concept, is used to examine the importance of relationships participants have to
other farmers whom they have asked directly for advice or knowledge about sustainable agriculture. Some questions in the SNAQ were designed by the PI to determine the importance of participants’ relationships with their alters, so that the third research question could be addressed. Questions 10.8 through 10.11 on the SNAQ (Appendix A) were designed to acquire quantitative Likert scale data about the relationships between participants and their alters. The following analysis of the SNAQ questions, using a strength of weak ties approach, addresses the larger research question intended to explore if community support reinforces participation in sustainable agriculture.

**Analysis of Weak Ties**

In order to understand the relative strength of weak ties within this network, the PI used density analysis to compare the SNAQ data. A network matrix was generated with UCINET that contained data that was symmetrized (transformed so that all ties were reciprocated) and dichotomized (transformed from scalar to binary), referred to as the Reported Tie Matrix. The Reported Tie Matrix contained a column for every participant and row for every participant and displayed a 1 if a tie was present between participants and alters and a 0 if not. The presence or absence of ties in the Reported Tie Matrix was solely based on the participant listing other sustainable farmers they knew in response to SNAQ Question 9. The density of the Reported Tie Matrix is shown in Table 6 below.

Likert scale data was collected with the SNAQ and used to rate the strength of relationships with participants and each of their alters. Of the Likert scale questions, numbers 10.9 and 10.10 in the SNAQ (Appendix A) are important when examining relationships. Question 10.9 asked the participants to rate the strength (where 5 was very strong, 3 was neutral, and 1 was very weak), and 10.10 to rate the importance (where 5
was very important, 3 was neutral, and 1 was very unimportant), of their relationships with each alter. Since the qualifiers related to each value were explicitly stated to each participant during the SNAQ process, any value reported below a four was not considered as a contributing factor in a strong relationship.

In order to examine the number of participants who rated their alters as important, the dataset for SNAQ Question 10.10 was dichotomized at a limit of greater than 3, herein referred to as the Importance Matrix. This means that a tie between a participant and their alter was displayed as present with a one if and only if they rated the importance of their relationship as important (4) or very important (5). A dichotomized matrix was also created in the same way for SNAQ Question 10.9 at a limit of greater than 3, herein referred to as the Strength Matrix. The researcher chose to select values greater than 3 because a Neutral relationship (i.e., one valued at 3 by the participant) would not be considered a strong tie. Dichotomizing is a standard practice in social network analysis (Borgatti et al. 2013; Prell 2012).

Question 10.13 in the SNAQ concerned whether or not the participant has asked each alter they listed for advice or knowledge regarding sustainable agriculture. The PI coded these responses into a binary yes or no and uploaded this dataset into UCINET 6.0 as a dichotomized, square, full matrix. For clarity, this matrix will herein be referred to as the Advice Matrix. In the Advice Matrix, participants reporting a relationship with another farmer would not be enough for a tie to represented, but they would also have reported they asked that farmer for advice. When a density analysis was run with UCINET on the Advice Matrix, there was a 58% decrease in the number of ties as compared to the Reported Tie Matrix, and therefore, there was a lower tie density.
(number of ties / number of possible ties), which is shown in Table 6. This means that participants only asked slightly more than half of their alters for advice, on average.

Table 6  Tie Density – Reported Tie vs. Advice

<table>
<thead>
<tr>
<th>Network</th>
<th>Density</th>
<th>Number of Ties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported Ties</td>
<td>0.023</td>
<td>139</td>
</tr>
<tr>
<td>Advice</td>
<td>0.013</td>
<td>81</td>
</tr>
</tbody>
</table>

In order to analyze the strength of the weak ties, a bootstrapped paired t-test was used to compare the densities of the Advice Matrix and the Importance Matrix. The purpose of paired t-tests is to determine if two different data sets are significantly different, with the null hypothesis stating there is not a statistically significant difference and the alternative hypothesis stating that there is a statistically significant difference. Therefore, in this paired t-test, the null hypothesis is that there would not be a significant difference between how important the famers rated their relationships and whether or not the farmers asked their alters for advice. The alternative hypothesis is that there is a significant difference between the density of relationships that are rated important and the density of relationships as defined by solicitation of advice.

Table 7 shows the results of the bootstrapped paired t-test which indicate that the density of the Advice Matrix is a significantly larger than the Importance Matrix (p-value < .01). This means the null hypothesis can be rejected and there is a significant difference between densities of the Advice and Importance networks. In response to SNAQ Question 10.10 the participants did not often rate their relationships with their alters as important or very important (4 or 5). However, they did often ask their alters for advice. To rephrase, there was a significantly larger number of alters that the participant would
ask for advice than the participant would consider important. This indicates these farmers perceive a number of their relationships with other farmers as weak relationships, but they would still contact these individuals for advice or knowledge regarding their farm. This result may suggest that farmers rated the importance of their relationships with their alters as low, but partially relied on those relationships for advice or information.

Table 7  Paired t-test – Density of Importance vs. Density of Advice

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Density of Advice:</td>
<td>0.0131</td>
</tr>
<tr>
<td>Density of Importance:</td>
<td>0.0057</td>
</tr>
<tr>
<td>Difference in density:</td>
<td>0.0075</td>
</tr>
<tr>
<td>Standard Error:</td>
<td>0.0025</td>
</tr>
<tr>
<td>Confidence Interval:</td>
<td>[0.0025, 0.0125]</td>
</tr>
<tr>
<td>t-statistic:</td>
<td>2.929</td>
</tr>
<tr>
<td>p-value:</td>
<td>0.0076</td>
</tr>
</tbody>
</table>

The SNAQ, which asked about relationship strength on a Likert scale (Question 10.9), was also dichotomized with a value restriction of greater than three, which produced a binary matrix with a one present for any tie that was listed at four or five (strong or very strong), creating a data matrix herein referred to as the Strength Matrix. The Strength Matrix was also compared, with another bootstrapped paired t-test conducted with UCINET 6, to the Advice Matrix to determine if there was a relationship between how participants rated the strength of their relationships and whether or not they asked their alters for advice. The null hypothesis for this test is that there is not a statistically significant difference in the density of the Advice Matrix when compared to the Strength Matrix. The alternative hypothesis, then, states that there is a statistically significant relationship between the densities of the two networks. In other words, if there is a statistically significant difference between the Advice Matrix and the Strength
Matrix, then there may be strong relationships between participants and their alters that were rated as neutral or weak relationships. The p-value (.124) and the t-statistic (1.1519) in Table 8 both indicate that the null hypothesis should be accepted. This means that the difference in network densities is not statistically significant, therefore there may not be ties that were rated by farmers as weak, but behave as strong.

Table 8  Paired t-test – Density of Strength vs. Density of Advice

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Density of Advice:</td>
<td>0.0131</td>
</tr>
<tr>
<td>Density of Strength:</td>
<td>0.0107</td>
</tr>
<tr>
<td>Difference in density:</td>
<td>0.0024</td>
</tr>
<tr>
<td>Standard Error:</td>
<td>0.0021</td>
</tr>
<tr>
<td>Confidence Interval:</td>
<td>[-0.0017, 0.0066]</td>
</tr>
<tr>
<td>t-statistic:</td>
<td>1.1519</td>
</tr>
<tr>
<td>p-value:</td>
<td>0.124</td>
</tr>
</tbody>
</table>

Comparing Table 7 and Table 8, the density of ties present in the Strength Matrix is higher than the density of ties in the Importance Matrix. This means that participants were more likely to rate relationships with their alters as strong or very strong (SNAQ 10.9) than they were to rate them important or very important (SNAQ 10.10). However, the results of the paired t-tests demonstrated in Table 7 and Table 8 do not support each other. The Importance Matrix (Question 10.10) asked the participants how important the specific relationship was to the operation of their farm. Participants often rated this low on the 1-5 Likert scale, which is what generated the lower density in this network when dichotomized for values greater than 3 (Neutral). However in the Strength Matrix (Question 10.9), dichotomized at the same limit of greater than 3, participants often rated the strength of their relationships higher, which created a network density that was not significantly different than that of the Advice matrix. Research questions two and three,
stated at the beginning of Chapter IV, were designed to examine the social networks of farmers’ social networks. This analysis of weak ties has explored some of the complexities of the social networks of sustainable farmers in Mississippi.

The goal of this analysis was to explore if ties that are considered weak in traditional social network analysis, actually behaved as strong ties. This researcher would argue that in this case, the results are inconclusive. While Question 10.9 (Strength Matrix) specifically asked if the farmer would consider their relationship to be strong or not, the definition of relationship strength in social network analysis (based on tie reciprocation and directionality) is slightly different than the way these participants would consider relationship strength. Mark Granovetter (1973:1361) defines a strong tie as, “a (probably linear) combination of the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie.”

There were no qualifying questions asked in association with Question 10.9 in the SNAQ that could have specified in what ways the participants’ relationships were strong. Therefore, it is distinctly possible that a participant would have considered their relationship with their alter as strong and rated it a four or a five, but have only been describing the amount of time they spend together, and not how much they mutually depend on each other, for example.

Thus, the other two networks, the Advice Matrix and the Importance Matrix, were included in this analysis to determine if sustainable farmers in Mississippi would have weak ties to their alters that they relied on more than they realized. In Table 7, the statistically significant difference in density of relationship importance (Importance Matrix) and the density of the inclination to ask alters for advice (Advice Matrix) suggest
that ties to alters may be more valuable to the participants than they are aware. Indicating that the alters are not important, by rating them three or lower more often, and then going on to ask them for advice about their farm or farming practices suggests that the alters are more important than the participants recognize.

This data suggests that this social network may be strong in certain portions of the state, but as a whole, state-wide network, ties are either weak or have only been recently formed. The results of the Advice Matrix density analysis in comparison to the Reported Tie Matrix indicate that participants are willing to ask some of the sustainable farmers they know for advice, information, or resources; and while participants view their relationships with other farmers as strong (Table 8), they do not view them as important (Table 7). This indicates that the network of farmers who participated in this research is young, meaning that while farmers have ties to many other sustainable farmers, those relationships are newly formed or underdeveloped.

The social networks of sustainable farmers in Mississippi are complex and this or another researcher should explore the networks more in depth in a future research project. As a case study, the social network data presented in this section demonstrates that the social networks and the qualities of relationships are thriving and very useful to participants. However, it is also important to understand motivations of participants. Practice theory warns that participants should not be compartmentalized, for example as farmers constructing community through social interaction, but should be viewed as whole beings interacting with each other and with their surroundings (Ortner 1984). Sherry Ortner (1984) says that individuals do not seek relationships for their own personal gain, i.e., farmers seeking advice on bettering their own farm production. Ortner (1984:519)
goes on to say that individuals have, “a sense of motive and action as shaped not only by problems being solved, and gains being sought, but by images and ideals of what constitutes goodness in people, in relationships, and in conditions of life.” Therefore, it is important not to focus only on the social networks and relationships of the participants, but on their motivations as sustainable farmers and as people. Who are these farmers and why are they participating in sustainable agriculture? Why are they interested in agriculture or sustainability at all? And how do they interact with their neighbors and consumers? These questions, as well as the rest of the research questions guiding this research, will be addressed below with the qualitative analysis of semi-structured interviews and participant observation.

**Qualitative Analysis**

In order to adequately assess the motivations of sustainable farmers in Mississippi, the PI used grounded theory (Strauss and Corbin 1994) to guide qualitative data collection and analysis. Grounded theory provides qualitative researchers the capability of deriving theory from their data collection and analysis, instead of starting with a theoretical perspective that may constrain their research. Strauss and Corbin (1994:278) state that theory should come out of, “interplay with data and developed through the course of actual research.” For this research project, grounded theory was used on transcripts of semi-structured interviews to identify themes regarding participants’ motivations, ideals, and relationships within the context of sustainable agriculture.
Motivations

While examining the motivations of sustainable farmers in Mississippi, textual analysis of semi-structured interviews indicates to this researcher that there are some common themes. Coding of data was based on commonalities in participant’s responses to semi-structured interviews and revealed four general themes. These four themes were established with a threshold of being coded more than 10 times in at least two separate interviews. Each theme will be demonstrated throughout this section with the voices of the participants and the author’s interpretation of their words, actions, and methods. In this section the four major themes are: Economics, Health, Self-Sufficiency, and Anti-Government.

This section is focused on the results of qualitatively examining the motivations of sustainable farmers in Mississippi. Specifically, the section will deeply explore the first research question, “are self-identified sustainable farmers in Mississippi drawn to sustainable agriculture only because they see that there is a market available, or are there social or environmental motivations for their employment of alternative agricultural methods?” Each of the themes listed above and discussed below address the first research question by simply exploring why participants are sustainable farmers. While the initial phrasing of the research question focused on determining if participants are solely economically motivated, other motivational categories presented themselves from a practice theory perspective (Ortner 1984). These motivations were identified through practice theory with the application of grounded theory (Strauss and Corbin 1994).
Economics

One of the research questions of this study specifically focuses on determining if sustainable farmers in Mississippi are solely motivated by economic gains and access to a market. Since this motivation was directly addressed within the research project and by the participants, this group will be examined first.

Economic concerns were present with every farmer who participated. Undoubtedly, every farmer who participated in this study discussed the difficulties they faced regularly with making ends meet in some way or another. One of the participants in this study put it into perspective for me when he said, "yeah, you can make a self-sustaining garden to feed your family, but it's another thing to be self-sustaining and feed enough people to make a living, you know?" (Saul Rain, personal communication, 2013). Another participant, Sydney Mosse (personal communication, 2013) said, “if you’re serious about making money as a farmer you better find every mode that he can to move the stuff from one place to another to get it off the farm. It’s not fun growing compost.” Sidney is referring to growing vegetables that do not get sold and end up as compost, which is not a profitable place for those vegetables to land. He was emphasizing the importance of accessing as many markets as possible to sell produce that he’s spent a lot of time and effort growing. This is an important hurdle for farmers, especially new farmers, because it is hard to estimate how much food they can sell.

Some of the farmers interviewed for this project (36%, 5 of 14) reported that they rely mostly on their farm income to make a living and do not have jobs outside of the farm. However, while many participants do have income outside of the farm (64%, 9 of 14), that income is often supplemental and not capable of fully supporting the family.
This is something sustainable farmers have in common with Sidney Mosse and his wife Helen. They have used multiple means of supporting themselves fully for the past eight years of their farming business. "Traditionally, I'm a painter," he said while filling seed starting trays, "but I haven't painted in the last eight months. So for the last eight months we've been very self sufficient and just living off the farm" (Sidney Mosse, personal communication 2013). Oftentimes for sustainable farmers who participated in this project, starting a farm does not mean that both or either partner is able to quit their job. There is usually a transitional period until the farm begins to make enough money to support their family. Gavin Pollack told me that his partner has an off farm job that helps support their family of three, "but this is the first year [Hana] worked part time. Up until [a year ago] she worked full time" (Gavin Polack, personal communication 2013).

However, the number of participants that are primarily motivated by economic gain is the smallest of all four motivational groups. Out of 14 participants in the participant observation and semi-structured interview portions of this research, only two farmers emphasized their farm’s primary function as making substantial income, beyond just supporting themselves. During formal and informal conversations 2 of 14 participants (14%) said things that indicated their motivations were primarily economic. This was determined from textual analysis of coded interviews, where these participants mentioned money as a stimulus more often than the other themes. For example, in reference to economic sustainability, Derick Foust (personal communication 2013) said, "I've always tried to be very conscious of the fact that, you know, people around me are going to depend on me for economic wellbeing." He continued his thought a moment later, "I enjoy living in the woods with no air conditioning and never going to town and
eating sweet potatoes I grew myself, but at some point I realized that if you want to be a
leader and make a difference ... you've gotta form things in such a way that it's financially
worth peoples’ while” (Derick Foust, personal communication 2013).

It is important to note what these two farmers do and how they operate their farms, as their farms are unique from other participants in this research project. Both of these participants produced meat they could sell at a premium and accessed specialty markets, such as farm-to-restaurant. These participants were unlike all of the others partially because they were the only producers of these goods in their area, and partially because they were producing specialty cuts of red meat that are expensive. So not only did they say they were economically motivated, but the scale of their farm and their style of business also indicated that they were primarily driven by making a profit.

Economic motivation is not something that should be viewed negatively. These farmers are, admittedly, less focused on the principals of sustainability than some of the other participants in this project. However, their lack of interest in sustainability as a concept does not make their contributions to sustainable agriculture in Mississippi less valuable. These farmers may not personally care deeply about environmental sustainability, but they recognize that their customers value food that is sustainably produced and their customers’ demand encourages them to continue to produce food sustainably. This is also not to say that these farmers do not take pride in the work that they do. They both displayed and discussed that they enjoyed the work they did. Sonny Parlow said he feels rewarded when he “is getting compliments from the kids when they come on tours. One young lady told us that this was better than going to Disney” (Sonny
Parlow, personal communication, 2013). He went on later to say, “that outweighs all of the negative” (Sonny Parlow, personal communication 2013).

The rest of the participants (86%, 12 of 14) are not primarily motivated by profit, however, they do discuss that making money is a part of running a business and a part of economic sustainability. In response to an interview question about the three pillars of sustainability, Saul Rain (personal communication 2013) said, “our goal is to have a balance in our life. Until we can be economically viable, it doesn’t matter. I hate to say that, but if we can’t survive economically, then we can’t do anything about the rest of it.”

The point is that the Rain family focuses on sustainability and self-sufficiency, but they also recognize that they are running a business to support their family.

Other participants interviewed for this research project said their focus was on producing healthy food and fostering a healthy environment, and that they money would work itself out. Edra Ringer (personal communication 2013) said, “I go to the farmers meetings and they say there’s not that much money in it. I said, well you know, there’s not that much money in farming, but I just like to do it. See the attitude? We have to change the attitude, too.” This sentiment was echoed by other participants, as well. They recognized sustainable farming as something they personally enjoyed doing. While their primary motivation wasn’t enjoying their jobs, practice theory tells us that this is an important characteristic to keep participants engaged in sustainable agriculture (Ortner 1984).

Health

The second theme in motivations, which was identified from grounded theory interview coding, are participants who were sustainable farmers because of health
reasons. These are farmers who are concerned with the practices of conventional agriculture that involve chemical fertilizers and pesticides. It is important to mention here that while most of the participants in this study discussed some concern with synthetic chemical usage in conventional agriculture, the participants in this group were emphatic about minimizing exposure to these chemicals, so much so, that the PI considers it a primary motivator for them starting their sustainable agricultural business. Leif Summers, a sustainable farmer who does all of his farming from a motorized wheelchair (which was inspirational in its own right) was critical of synthetic chemicals when asked about why he wanted to be a sustainable farmer. He said, "The use of chemicals everywhere is just, you know, just creating problems beyond what we realize. And I think looking at how to do things with less and less chemicals or doing ways to enhance where you live, instead of adding chemicals to it it is the best way to go about trying to do it" (personal communication, 2013). Leif and his wife, Charlsie, are just one of many of the participants in this study who strive to be resolutely sustainable in their farming practices and their lives.

Health isn’t always about the individual when it comes to farming and sustainable farmers, however. Dylan and Laura June are a couple of sustainable farmers who have a number of motivational foci that keep them dedicated to sustainable farming, but one that was particularly obvious was their interest in having a healthy ecosystem, not just a farm. Laura June described their ultimate aspiration when she told me, “our goal is to leave the farm better than when we got there. Or any piece of land that we’re on” (Laura June, personal communication). When I asked Laura what things they do specifically to improve the land she told me, “we use the pigs for sustainable forestry. Using them to do
disturbance and clear out invasive species and having an overall healthier ecosystem” (Laura June, personal communication 2013). Having a healthy ecosystem is intrinsically important to this pair of sustainable farmers, but they also are able to realize the benefits of not isolating multiple methods of production. This focus on integrating systems within the farm is something that was present throughout all of the farmers interviewed in this research project. It was summarized best by Charlsie Summers when she told me, “the biggest [sustainable practice] is just how you think about, you know, thinking about the farm as a system… as a complex biological system and trying to be creative about finding ways to work within the system, instead of against the system” (Charlsie Summers, personal communication 2014).

Laura said that not only does rotating their pigs create a healthy ecosystem for their animals to live in, but it also has real applications. “We use [the pigs] to turn our compost so we don’t have to get outsider fertilizers for our garden” (Laura June, personal communication 2013). Pigs feed in a natural setting by rooting, or using their snouts and hooves to dig and push soil around in an attempt to find edible roots and food in the dirt. Laura and Dylan can use the pigs’ natural drive to forage in this way to turn their compost so they don’t have to do it themselves. Laura and Dylan also discussed how a healthier ecosystem leads to healthier animals, which is beneficial for the animals, farmers, and consumers. Dylan said, “we integrate the animals together” and Laura followed by saying, “Yeah, which makes the animals healthier” (Laura June and Dylan Gold, personal communication 2013). Earlier, during participant observation, Laura and Dylan explained and showed me that rotating chickens through the same pastures that their cows have grazed interrupts the natural cycle of parasitic worms that affect their
cows. The chickens scratch and peck the cow manure and will consume the parasite’s larvae. These larvae cannot harm the chickens and are actually good food for the chickens. Any parasite larvae that the chickens do not eat, will most likely be exposed to sunlight by the scratching and pecking, which will also kill the larvae.

Many animal farmers emphasized the happiness of the animals they were raising. Beyond the animal rights/humane treatment argument associated with keeping livestock happy, there is also an argument that happier animals produce better quality meat. Wilmer Hedgewood is a pig farmer and while he explained his interest in raising animals, he also emphasized the importance of keeping animals happy.

I mean, mainly when I was a kid, I raised fowl, but you know, they’re happier when you let them roam around! They’re not like, covered in shit, you know? And you can tell when an animal is enjoying itself, or, you know, he’s not sick. You know, I don’t know if an animal’s enjoying himself, but I can tell, I guess, when he’s healthy. And that, to me, means, you know, he’s got energy, he’s moving around, he’s very responsive. Um, so, to me, that’s so much more gratifying, to raise animals that are that way, that are healthy, that are fat, they’re having, you know, they seem to be running around, have tons of energy, they’re interacting with each other in ways that are, often times, really amusing [Wilmer Hedgewood, personal communication 2014].

Animal mental health is usually discussed with pets, but very rarely discussed in terms of livestock. However, with sustainable producers of animal products in this study, the mental health of the animals was often listed as one of the motivators for using particular sustainable farming methods. As seen above with the chickens being rotated on pasture,
not only is that beneficial to the farm, but it is the natural lifestyle and behavior for the chicken. Farmers often equate the ability of animals to live and behave naturally (or as naturally as possible) to that animal being happier, and thus producing better quality eggs or meat.

Animal producers are not the only farmers motivated by health concerns. Edra Ringer, a vegetable and herb farmer who also produces medicinal combinations of herbs and oils, was discussing conventional farming methods versus sustainable during her interview. Edra said she prefers sustainable methods because she is focused on, “living in harmony with the natural rhythm of life” (Edra Ringer, personal communication 2013). Edra went on to explain conventional methods are bad for people,

Because you’re going, you’re going against the natural rhythm. You’re going against how things was meant to be. And you a part of that. So if you go against that, you’re going against yourself. You know, they say ‘sick soil, sick people.’ And healthy soil, healthy people. The goal is that for the vitality and life to be in the food. If the food is dead, it’s not going to do your body any good. You know? Your body is just going to be consuming dead food. And it’s never gonna, your cells want to have something live. SO if they get something dead, they only can reproduce what they get. You know? We continue, our body’s continually renewing itself. So if you gave it something that it can renew itself off of, the vitality from the food, then it’s gonna stay strong and healthy for you. If not, you know, we know the opposite effect of that. [Edra Ringer, personal communication 2013].
Edra articulates here what 86% (12 of 14) of the farmers who participated in this study also discussed during semi-structured interviews. They feel that conventional farming removes the life and the humanity from the food that is produced. They also recognize, within the conventional model of agricultural production, food is produced with harmful synthetic chemicals, which they prefer not to consume or use in the production of food on their farm. Rosaline Evans is another farmer who spoke about her distaste for the use of chemicals in the conventional food system. She told me, “I worked in healthcare and my husband’s in healthcare and we just really strongly believe that food is, um it causes a lot of the illnesses we are seeing now” (Rosaline Evans, personal communication 2013). Many of the participants in this study were fundamentally opposed to synthetic chemicals and if asked directly, would list this as a major motivator in the decision to grow their own food.

As demonstrated throughout this subsection, concerns about health were vividly present among many of the sustainable farmers who participated in this research project. Be it their own personal health, animal health, environmental health, or health of their consumers, a majority (86%) of participants in this research project discussed health being a concern. However, health was the primary motivator for 6 of 14 (43%) of participants in this research project. This was determined via textual analysis and coding of interview transcripts, as these six participants mentioned health-related topics more often than the other three motivational categories.

Self-Sufficiency

One of the themes identified via the coding process, which was not explicitly solicited by the researcher or research questions, was an emphasis on the importance of
being self-sufficient. This theme of participants’ motivations overlaps with many of the farmers who also described health as a major motivator. “I really got a lot of influence from the Nearing’s,” Saul Rain stated, in reference to Scott and Helen Nearing (Nearing and Nearing 1954). He went on later to say, “They’re Marxists, but they were self-sufficient and self-sustaining” (Saul Rain, personal communication 2014). The Rain’s emphasis on self-sufficiency was very apparent. They discussed this concept in terms of their farm as a system, as well. Saul said, “we want to use, we want to produce everything here. Self-sustaining. So that we can be more self-sustaining in growing food. And providing for other people, not just for ourselves” (Saul Rain, personal communication 2014). Sustainable agriculture’s focus on self-sufficiency was started by the Nearings and has persisted as an important goal for many sustainable farmers since (Nearing and Nearing 1954; Prody 2015). As established by Jessica Prody, “Helen and Scott Nearing became the model of many of these back-to-the-landers turned to as they sought an alternative society in rural living” (Prody 2015). Explicitly stated above by the Rains, the Nearings are still the model that Prody (2015) describes.

Self-sufficiency was a theme that overlapped with the other two themes a lot. Participants were grouped into this category though textual analysis of the coded interview transcripts because while they often mentioned health and concerns with government regulations as motivators, they also discussed being self-sufficient more often than the other participants. Four of 14 (29%) of sustainable farmers who participated in this research project were more motivated by being self-sufficient, being able to live off the land, than any other motivational category.
Elwood Foxworth was another participant who was interested in this concept of self-sufficiency and was forthright about his initial personal interest in this subject, which started when he was very young. Elwood said, “I was interested in self-sufficiency. Since I was probably like 13, I wanted to be a hippie. I just thought it was, I don’t know, cool, or just, that’s just the image that I wanted to buy into” (Elwood Foxworth, personal communication 2013). Eventually his interest in becoming a hippie led him to college in California where his horizons on being a hippie were broadened. He told me,

As far as like, really living that stuff, probably when I moved to California. And I was 19. Yup. But a lot of, um… To me, so much stuff was just wrong with American culture and I… I like people, I like relating to people, and stuff, but in a lot of ways, I chose this lifestyle just to kinda opt out of some of the things that I am morally or socially uncomfortable with [Elwood Foxworth, personal communication 2013].

For Elwood, and some other farmers who participated in this study, being a sustainable farmer is also a way to protest the conventional method of agricultural production. Rejecting portions of current American culture and forming a counter-agriculture is another theme that was extracted from some participants using grounded theory. The next section of motivations examines these themes more directly.

Anti-Government

The reader may have noticed that throughout this project there has not been much mention of Certified Organic or the National Organic Program. This is because many of the participants in this research project feel that regulations established by the National Organic Program’s for Certified Organic food are not strict enough. These farmers feel
that the certification itself is not worth their time or money and rely on their personal relationships with their customers. One participant, Laura June, said, “We don’t plan on doing any certifications, just because a lot of times, certifications can mean nothing,” and her partner followed up with, “I’d much rather just build a reputation with direct consumer to producer relationship and leave it at that” (Laura June and Dylan Gold, personal communication, 2013). Dylan and Laura are echoing the sentiments of most of the sustainable farmers in Mississippi who participated in this project. These are farmers who are selling directly to the consumers of their products. Since certification is an expensive and time-consuming process, most farmers don’t see a benefit when they can just communicate with their customers directly and tell them that their vegetables are pesticide free or even invite customers to their farm to see how they rotationally graze their chickens. Much of their rejection of the National Organic Program and Certified Organic also has to do with some participants’ distrust of the government and the conventional agricultural system.

The theme of Anti-government was also unintentionally discovered via the grounded theory coding process of the semi-structured interview transcripts. None of the research questions designed for this project were intended to focus on or explore the participants’ political identification or feelings towards their government. However, the grounded theory process proves quite useful here, as this theme was common across participants. This section explores why the anti-government theme was a motivator for some participants in this study.

Isaiah Hare has been a sustainable farmer for fifteen years raising multiple species of animals, processing them on his farm, and selling them directly to consumers, as well
as to nearby restaurants. Isaiah, along with a number of other sustainable farmers in Mississippi, frequently mentioned that government regulation of smallholder agriculture made his life as a sustainable farmer very difficult. Much of the government regulation that exists in agriculture is framed as being motivated by preserving the health and safety of the consumer of the agricultural products. But those regulations become a daily battle for the farmers, as Isaiah said, “You don’t fight anything from customers relationships, you know, social aspects. … What you fight is, regulations, regulations, regulations, regulations” (Isaiah Hare, personal communication 2013). Many farmers view the government in a very negative light because of their experiences with regulations and inspectors. These regulations often create situations where farmers are required to spend between $15,000 and $30,000 to build facilities, purchase equipment, or both to stay within regulation. Participants in this research project argued that the problem was not with understanding the regulation, but with complying with the regulations, due to their inability to compete with conventional agriculture’s industrial complex and economy of scale.

Not only does the small farmer have difficulty affording regulatory compliance, but they also cannot afford time or money to work to change the regulation. “Big dairy, big beef, big chicken, big Ag! Everybody comes in all under one big tent with all their money and attorneys and their lobbyists and they say ‘here’s how we want the law to read.’ … And so it’s not like you can point at government and blame them” (Isaiah Hare, personal communication 2013). Conventional agriculture is often organized and lobbied for by the big businesses who own or process the meat, not the by the farmers, themselves. Small farmers who struggle with regulatory compliance recognize that they
cannot compete when it comes to influencing how the laws are written concerning agricultural regulation because they can’t afford to hire someone to lobby for them or someone to work/manage their farm if they were to lobby for themselves.

Very recently there has been some cause to hope for sustainable farmers, however. The Mississippi Food Policy Council (MSFPC) is a lobbying group for stakeholders in local agriculture.

“They’re working on it. There’s a team of hotshot young lawyers outa Harvard, right now, that’s working on it. … There’s this food policy team that’s working with these folks outa Jackson … and they are spinning heads left and right!

[Isaiah Hare, personal communication 2013].

MSFPC was designed to bring together stakeholders in the production of fresh foods across Mississippi to discuss and resolve issues with local food systems and the state regulations regarding those food systems (MSFPC 2015). Members include farmers, lawyers, non-profits, conventional agricultural lobbying groups, public universities and agricultural extension, and government agencies. While this group is working to provide a voice for sustainable and alternative farmers in Mississippi, as a non-profit organization, it speaks to the participants’ anti-governmental sentiments.

Some of farmers who participated told me they are relatively new farmers who don’t have the time or money to focus as much on networking and capacity building as they would like. Qualitative analysis also found that participants feel that farmers cannot often afford to be away from the farm very often. Because farmers feel so physically bound to their farms and cannot afford to pay someone to run the farm, if they were to leave, they have very limited opportunities to network with other farmers. This only
leaves time for networking at community events where a number of farmers would be present at the same time, such as a farmers market. This is the reason the MSFPC was created, to help these farmers who cannot afford the time or money to network or speak for themselves on regulatory issues.

While farmers try to network with their colleagues, farmers markets are often quite busy for the farmers. This was discovered from participant observation and interviewing participants, and helping one participant sell produce in a market setting. Farmers have so much more responsibility at a market, especially if the produce they have that week is special or in high demand. It’s also easy to overlook the amount of work a market is for a farmer. Farmers are often awake and preparing for a market two to three hours or more before the market begins. That means 4:00 in the morning or earlier! All of this discussion about farmers markets here is to establish that while farmers may attend the same market every week for a whole summer or more, they may not be able to socialize or network at the end of a market day. And thus, the social networks of farmers in Mississippi are established and although they could be stronger, the farmers benefit from community building organizations like GGSIM and the MSFPC.

The farmers who produce animal products in Mississippi encounter regulatory challenges with their farms most often. The difficulties with regulations were summarized by Dylan Gold when he told me, “Non-scaleable regulations make it hard for small farms to even get started” (Dylan Gold, personal communication 2013). The concept of non-scaleable regulations Dylan referred to is something that can occur with economies of scale. Isaiah Hare (unknowingly) explained small farmers’ issues with economies of scale and non-scaleable regulations well when he said,
If you’re milking five hundred head of cattle a day, then you need a holding tank for, God knows how many, gallons of milk, you know, and all that stuff. Well you cannot force that same, you can’t say that you’ve gotta have a five thousand gallon milk tank, stainless steel, a cooling swirler, you know, and all this stuff. You can’t tell this guy down here, Ellis Price, that’s milking ten cows a day, that he has to have that same thing! It’s ridiculous! This stuff has to be scaled! [Isaiah Hare, personal communication 2013].

Frustration was wildly present among sustainable animal producers in Mississippi. At the risk of dwelling on regulatory challenges of some participants, this short discussion with Isaiah Hare is a succinct example of how the farmers sometimes view regulations that are supposedly written in the best interest of the consumer.

Isaiah Hare: But if you look at this situation. OK, what, for me to sell you a chicken, to travel somewhere to a farmers market, travel an hour, alright? And sell you a chicken, alright?

Casey Odom: Mmhmm.

IH: OK. For, you, you answer this question. What would, for your, what would be the concern for my product? What would be the concern? What’s, what is the issue?

CO: The chicken having bacteria or something on it from the travel, right?

IH: OK. Which would be related to what?

CO: Temperature.

IH: Temperature!

CO: Right. Yeah.

IH: The issue is the temperature.

CO: Right.

IH: Alright. Now, I don’t care if I had it on ice, regular ice, dry ice, a gigantic 18-wheeler, you know? Or, or, a bicycle! I don’t care what it is, if as, if at the point of sale, that bird is within temp guidelines, temperature guidelines at the point of sale, how I got it to you and what it’s in is irrelevant.

CO: Yeah.

IH: Would you not agree?

CO: Yeah.

IH: Alright. Well tell a bureaucrat that.

[Excerpt from an interview with Isaiah Hare, personal communication, 2013].
This frustration with government regulations was often linked to the participants’ overall political identity. While there were no specific questions about governmental or political views in the semi-structured interview schedule, a discussion of regulatory frustration would occasionally lead into a discussion of general mistrust of the American government. There were no questions asked that required the participants to specifically state their political ideologies or what motivated them to identify with these particular ideologies. However, based upon informal conversations during participant observation, at least one third of the participants may have identified themselves as libertarians, had they been asked directly.

As demonstrated above, a small portion of participants (2 of 14, 14%) in this research were using sustainable and alternative agriculture as a form of protest against conventional agriculture and conventional American society. In this instance, they are not only protesting the conventional agricultural industrial complex, but also the American government, and even much of American society. It is important to note that this small group of participants also demonstrated being motivated by health concerns and self-sufficiency concerns. Both participants acknowledged that they started farming for health or self-sufficiency, but that they now are motivated to continue to participate in sustainable agricultural methods as a rejection of conventional agriculture. This data was extracted from the coded interview transcripts by exploring if anti-governmental themes were discussed more often than health or self-sufficiency themes. While some participants do have issues with the government and government regulations, there are also participants in this case study who received assistance from the government. The following section discusses government assistance of sustainable farmers in Mississippi.
Government Assistance

In the previous section a portion of participants in this study were demonstrated to have some anti-governmental inclinations. However, some participants who had a focus on making ends meet were willing or even happy to work with governmental agencies to get extra grant funding. This section also addresses the fifth research question, which sought to investigate if participants were involved with regulatory groups of sustainable agriculture.

Eight out of 14 (57%) of the farmers who participated in the semi-structured interviewing portion of this research project stated that getting financial assistance was something that allowed them to have greater success starting or maintaining their farm. This financial assistance came from one or more of three major sources: the USDA, NRCS, or private individuals (usually relatives). One of the most well known agencies with farmers and conservationists is the Natural Resource Conservation Service (NRCS). The NRCS has a few different programs that provide financial assistance in the form of grants to farmers in particular. The two main programs that farmers in Mississippi use that are sponsored by the NRCS are the Environmental Quality Incentive Program (EQIP) and the Small Ruminant Farmer Initiative (SRFI).

EQIP is a program that is supported by the NRCS, which has three initiatives: National Energy Initiative, National Seasonal High Tunnels, and National Organic Initiative. Interestingly enough, none of the farmers who participated in this research were Certified Organic at the time, and only one farmer was interested in becoming Certified Organic in the future. All of the farmers who received federal EQIP grants actually applied for a National Energy Initiative or a National Seasonal High Tunnel, which was
somewhat unexpected by the PI. This, however, was easily explained by many of the participant’s motivations to be farmers to begin with. “Being sustainable is much more than just using organic sprays” (Charlsie Summers, personal communication, 2014). Another participant said, “What is sustainable? It’s not just going and buying fish emulsion, that’s an organic fertilizer, it’s figuring out how to produce your own fertilizer and soil inputs on your own place” (Sidney Mosse, personal communication, 2013).

All of the participants who applied for the National Energy Initiative portion of EQIP have focused on water management, usage, and quality in an agricultural setting. The farmers who received EQIP grants for water management issues have all had freshwater wells drilled on their property to use for irrigation. The NRCS is interested in providing farmers with a well and pump because having a more efficient pump can reduce the amount of electricity that is used to pump the water. They are also no longer connected to city water systems, if they live within city limits, which is beneficial for both the city and the farmer.

The Mississippi NRCS also offers the SRFI, which is aimed mostly at farmers who are raising goats for meat or milk. To qualify for this grant, farmers must be raising goats and must use their money to improve the use of their natural resources while raising goats. For the farmers, this is usually applied to infrastructural improvements on their farm. Some of the farmers that I talked to used this grant to build the fences for their paddocks. One of the sustainable farming practices associated with raising animals is rotational grazing. For the farmers to be able to rotationally graze their animals, they have to divide their land into smaller parcels called paddocks. The farmers will then move their herd’s from paddock to paddock on a schedule so that while one paddock is being
grazed the others are resting and replenishing biomass. This method of grazing animals conserves natural resources in a number of ways: reduction of irrigation of pastures, reduction of soil erosion, and reduction of nutrient runoff (Salatin 1995).

The most interesting conjunction with participants and the NRCS is that these farmers were interested in many practices that conserve natural resources before they interacted with the NRCS. While in most cases the NRCS did not initiate the farmer’s interest in conserving natural resources available to them, the NRCS has allowed some farmers to take steps towards conservation that would have been economically prohibitive otherwise. Individual experiences with NRCS have varied across participants, however. For farmers to apply for NRCS grants, they must acquire applications from their county NRCS Office, fill them out, and then return the application, along with other required documentation, to the local NRCS office, who then deals with the State and Federal NRCS offices. Many of the farmers who interacted with the NRCS were happy with the services they provided. One of the participants said of the NRCS, “I like that program because it’s more sustainable. Much more sustainable. You know? They, they mostly deal with like, clean water. They’re more, that branch is more concerned with protecting the Earth” (Sidney Mosse, personal communication, 2013). Another farmer told me, “[I have been] getting with NRCS and just really trying to tap into a lot of the resources that are available for farmers in the area. And that’s been really great because those guys are so helpful and they want to help you out, they want to try to see if there’s grants out there for what you’re doing” (Wilmer Hedgewood), personal communication, 2014). Most of the farmers who received NRCS grants seemed to echo this positive feedback.
While the majority of participants who received grants from the NRCS had positive experiences, it is important to discuss that some of the participants reported having trouble in getting the applications from their County NRCS Office. Some of the offices were unfamiliar with the EQIP and SRFI grants and did not initially believe they existed. Another participant said, “We spent eight months trying to get them to find out what the organic program was,” and then they went on to say, “They didn’t even know there was a program for organics within the NRCS. I had to show it to them on their computer” (Sidney Mosse, personal communication, 2013). This particular participant eventually gave up and finally said, “every government program we’ve tried to get involved with just turned out to be a big fiasco and waste of time on our part. So we just don’t anymore” (Sidney Mosse, personal communication, 2013). While this was just one participant’s experience, it is important to be aware that negative reactions to Organic and sustainable agriculture can cause farmers to stop looking for help from the NRCS, and thus potentially conserve less due to the lack of aid from the NRCS.

Sustainable farmers rely on the natural resources that are available to them to subsist and make a living. The NRCS’s initiatives to help farmers conserve natural resources seems to be beneficial to everyone involved, including the other people in the area who may also rely on the same natural resource pool. While the many of the participants in this study were interested in utilizing their natural resources efficiently, the NRCS has helped them operate their farm more efficiently while still considering their usage of natural resources with particular big budget items such as High Tunnels and Irrigation. This has been a very valuable resource for small self-identified sustainable farmers in Mississippi who, oftentimes, need all the economic support they can get.
Chapter Summary

This chapter has reviewed the processes of, and presented the results of, data analyses that were conducted for this research project. Results presented in this section were framed by the research questions stated at the beginning of this document. The following subsections review the results presented in each section.

Quantitative Summary

A sample description was presented at the beginning of the chapter, which included demographic information and analyses. This section addressed the fourth research question stated at the beginning of this project, which focuses on discovering if specific demographic groups were participating in sustainable agriculture in Mississippi. This section concluded that, while farmers 46 and up were more common in this research project, farmers between 18 and 45 were more likely to be new to sustainable farming. As well, the demographic information demonstrated that participants in this research project are better educated (college and graduate school) than conventional agriculturalists in the United States, however almost none of these participants were educated in fields that were directly related to farming. Lastly, farmers who participated in this study followed the trend of all farmers in the United States when looking at marital status. Almost all of the participants in this research project were married.

Social network analysis data was also presented in this chapter. This section displayed and described the social network map of participants in this study. As well, this section discussed the strength of weak ties concept. Through the social network data presented in this section, the second research question (How is the community of participants constructed?) and the third research question (Does the community of
sustainable farmers encourage continued participation in sustainable agriculture?) were both addressed. Participants rated their relationships with other sustainable farmers in Mississippi on a Likert scale in response to SNAQ questions. This Likert scale data was compared to participants’ reported actions of asking their alters for advice using social network analysis, specifically density analysis. The results in this section were inconclusive. Participants were unlikely to rate their relationships with other farmers they had asked for advice as important. However, participants did rate their relationships with farmers they had asked for advice as strong. This suggests that participants may have new relationships with farmers they have asked for advice. The analysis in this section also suggests that this network of sustainable farmers is young and underdeveloped.

**Qualitative Summary**

Qualitative data analysis was also presented throughout this chapter. Specifically, addressing the first research question, which focused on determining what motivates participants in this research project to employ sustainable agriculture. Through textual analysis of coded interviews, four motivational groups were identified: Economics, Health, Self-Sufficiency, and Anti-Government. All of the participants exhibited qualities of at least two of these motivational groups. However, participants were classified into one group because they demonstrated their primary motivation via the things they said during their semi-structured interviews and participant observation. As described above, 2 of 14 (14%) were primarily motivated by economic success, 6 of 14 (43%) were motivated by health concerns, 4 of 14 (29%) were primarily stimulated by being self-sufficient, and 2 of 14 (14%) were focused on using sustainable agriculture to protest conventional agriculture and American government regulations.
The final subsection of qualitative analyses presented data on participants who were involved with government agencies that provided monetary assistance to the participants. The group of participants who used government assistance was discovered as a consequence of exploring the anti-government group of participants in coded textual analysis. This subsection also addresses the fifth research question, which focused on if participants are involved in regulatory bodies of sustainable agriculture. This section presented that 8 of 14 (57%) of participants in this research project had received monetary assistance from the government that allowed them to continue or expand their sustainable farming operation.
CHAPTER VI
CONCLUSION AND DISCUSSION

This chapter focuses on the results presented above and attempts to outline the contributions made by this project to the body of knowledge of sustainable agriculture discussed at the beginning of this project. The PI’s personal experiences with sustainable farmers and the Gaining Ground Sustainability Institute of Mississippi (GGSIM) suggested that a community of sustainable farmers in the state of Mississippi is beginning to thrive. The only published anthropological examination of sustainable agriculture in Mississippi does not examine self-identified, sustainable agricultural producers, but looks at conventional farmers employing sustainable methods (Shoreman and Haenn 2009). Shoreman and Haenn’s study imply that those are the only farmers in Mississippi who are using sustainable methods in agricultural production. This research project’s data supports the conclusion that there is a blooming sustainable farming community in Mississippi, but also laid the groundwork for future studies regarding sustainable farmers in Mississippi and across the Deep South. The limitations and future applications of this study are also outlined in this chapter.

Discussion

The three pillars of sustainability have exhibited themselves in the motivations of self-identified sustainable farmers who participated in this research project. As discussed
above, the three pillars of sustainability is a widely accepted standard for accessing and analyzing sustainability. The three pillars are: economy, environment, and society (Dawe and Ryan 2003; Gould and Lewis 2009). When looking at the motivational categories established from grounded textual analysis of coded interviews of participants, one can see similarities between participants’ motivations and the three pillars.

The most obvious connection is the small group of participants who were focused on economic success for their business. These participants were employing sustainable methods and all three of the pillars of sustainability, but their primary goal was to grow their business for their own economic gain. This group is important to this research project and should not be perceived as inauthentic or opposed to sustainability, as the methods they were employing were in line with the other sustainable farmers in the state. As small business owners, income is vitally important for sustainable farmers (Ikerd 2011; Stanford 2006). If they are truly employing methods that support the other pillars of sustainability (environment and society), they should not be demonized for their monetary focus. John Ikerd (2011:5) said, “Economic viability is one of the cornerstones of sustainability. Thus, sustainable farms must be profitable. It’s just that profits can’t take priority over everything else.” Participants in this research project have personified Ikerd’s (2011) warning here by having a focus on economic success, without letting that focus cloud their commitment to sustainable farming methods.

The second pillar of sustainability, society, is present in the motivations of the farmers interviewed for this project. As is clear from the social network analysis, there is a community of farmers connected to one another in various ways. Brian DeVore (2002:111) said, “networking with other farmers is critical to the success of transitioning
into sustainable agriculture.” Farmers who were focused on their difficulties with government regulations discussed how the MSFPC’s efforts to improve the effects of agricultural regulations on small-scale, sustainable farmers have been very important to them. DeVore (2002) proves to be right about sustainable farmers’ dependence on networking, as the MSFPC is one instance that helps build the sustainable agricultural community in Mississippi. As well, farmers provide societal benefits by building relationships with their consumers, and often further connect consumers with similar interests to each other.

Environmental sustainability is also clearly found as a motivation for two of the groups established in the previous chapter. Participants who were categorized as being motivated by health reasons were not just concerned about personal health. These participants were also concerned about the health of their consumers and the health of the environment they rely on to produce food. Many of these farmers exemplified Jackson and Jackson’s (2002:6) “agroecological restoration” concept with their focus on environmental health. These farmers were not only avoiding the use of synthetic chemicals on their farms, but were also interested in creating a farm that worked with the surrounding ecosystem and restored the environment of the soil and land. These participants are particularly important to sustainable agriculture in Mississippi, as Shoreman and Haenn (2009) argue that the only engagement with sustainable agricultural practices in Mississippi is selfishly motivated by conventional farmers who are trying to save money and avoid further government regulation.

Participants who are focused on self-sufficiency are also engaged with and motivated by the environmental sustainability pillar. Farmers focused on self-sufficiency
exemplify Nearing and Nearing’s (1954) attempt at rejecting participation in American
society, but they are also focused on benefiting their environment. Obviously being self-
sufficient is not a concept that has been invented by the sustainable farmers in
Mississippi. However, their commitment to being self-sufficient is at least partially
rooted in their interest in environmental preservation or conservation. Again, this attitude
is important to recognize in sustainable agriculturalists in Mississippi, as a counter to
Shoreman and Haenn’s (2009) assertion that agriculturalists in Mississippi are not
interested in self-sufficiency or in environmental conservation (Shoreman and Haenn
2009).

Engagement with farmer’s actual practice displays the participants’ enacted
sustainability and sustainable agriculture, specifically through their sustainable methods
as well as via their own words and responses to interview questions. While some might
suggest that participants in this research project are reproducing the ambiguity often
associated with sustainability, the PI would argue that these nuances are critical to
sustainable agriculture (Fricker 1998; Sarewitz 2001). Each individual’s implementation
of sustainability, and thus their definition of sustainability, varies based on their farming
needs and what motivates them to employ sustainability. Sustainability has been said to
be, “a woolly, ambiguous concept that is resistant to precise definition, fraught with
internal inconsistencies, and difficult to apply in practice” (Sarewitz 2001:74). However,
participants in this research project have not only demonstrated with inspirational passion
and motivation that sustainability can be applied to agriculture successfully, but also that
sustainable farmers in Mississippi are working together, with the help of community
organizations (GGSIM, MSAN, MSFPC), to grow the sustainable agricultural community in Mississippi.

**Research Conclusions**

Discovering the motivations of sustainable farmers in Mississippi has driven this study from the very beginning of project design in order to establish a foundational understanding of sustainable farmers in Mississippi. The first research question outlined at the outset of this project has led this research to discover that there are farmers in Mississippi who have economic motivations. However, 12 of 14 (86%) farmers who participated in this study were motivated to employ alternative agricultural methods for social and environmental reasons, as demonstrated above.

The research questions designed to explore the social networks of the participants have also been partially answered. GGSIM, their new sister organization, the Mississippi Sustainable Agriculture Network (MSAN), as well as the Mississippi Food Policy Council (MSFPC) discussed above, are examples of how farmers in Mississippi have constructed community and structure within their own social networks. Based on the lack of connectedness on the periphery of the social network, presented on the network map in Figure 4 above (p. 107), the social network of sustainable farmers in Mississippi has room to grow. While there is one large group in Figure 4, there are also three isolated groups that are completely disconnected from the network. These isolate groups are also disconnected from each other. This demonstrates that while there is a large group of farmers connected through GGSIM, there are also other sustainable farmers in the state who are completely disconnected from the participants in this research project. This also
indicates that there may be social networks of sustainable farmers in Mississippi of which GGSIM is not aware.

Together, research questions two and three intended to determine if the social networks of sustainable farmers foster community that encouraged participation in sustainable agriculture. As demonstrated above, the social networks of sustainable farmers in Mississippi are not densely connected, with a network density of only 0.023. The network map in Figure 4 above shows a strong group that is well connected in the center, but poorly connected in the periphery. The low network density indicates that applied anthropology has the potential to benefit sustainable farmers in Mississippi by helping them connect with each other.

As demonstrated above, new, young farmers have entered sustainable agriculture in Mississippi without an agricultural background. Participants have made connections, however, and were willing to ask other farmers for advice. Since many participants do not have an agricultural background, they have been slow to build relationships with other farmers which they consider to be important. This indicates that applied anthropology could help to promote community growth within sustainable farmers in Mississippi. By connecting new, young farmers to each other, or more experienced farmers, applied anthropology has the potential to expand the strength of the community of sustainable farmers in Mississippi.

Community strength may also benefit from addressing racial division among farmers in Mississippi. Only 14% of participants in the semi-structured interview were non-white, while 40.3% of Mississippi residents are non-white (USCB 2014). One might suspect that there are more non-white, sustainable farmers in Mississippi who are not
represented in this study. From experience at farmers markets, the PI believes that there are more non-white farmers in Mississippi. However, these farmers most likely do not identify themselves as sustainable farmers. While it is unknown if these small, non-white farmers are sustainable farmers, it is distinctly possible that they are employing some sustainable farming methods. This portion of the farming population in Mississippi should be examined in future studies of sustainable agriculture in the state.

Another concern is why the participants in this study were mostly white. The PI suspects a contributing factor to the lack of racial diversity is due to the source of participants for this research project, which was the initial list of 93 potential participants created with and obtained from GGSIM. While there was no demographic data collected about GGSIM or its members during the PI’s internship, it was noted that most of the individuals involved with GGSIM were white. This is not a critique of GGSIM; they were aware of their lack of racial diversity and worked to increase diversity whenever possible. Again, this indicates that examining the suspected group of non-white farmers in Mississippi would help to link the social networks of white and non-white farmers, which could lead to a stronger community of sustainable farmers in Mississippi.

The final research question above sought to answer whether sustainable farmers in Mississippi are more or less likely to be involved with a third party certifying organization. Rebecca L. Schewe (2013) established that alternative agricultural producers go through a process of negotiated decision-making when deciding to acquire certifications for their farms. Schewe (2013:256) says, “Negotiated decision-making rejects the binary between financial and ideological motivations for certification and incorporates the structural constraints of social network ties and commodity chain
position into understandings of decision-making.” Participants in this research project were shown to have rejected participation in Certified Organic agriculture as a model of sustainability. Some said the regulations enforced by the National Organic Program (NOP) were not strict enough, while others said that the expense for getting certified and recertified was not worth the benefit. Another group of participants said the regulations were too strict on some issues and not strict enough on others, or just generally didn’t apply to them. Many didn’t see the benefit of having an Organic certification for the food they produced because they maintained very personal relationships with the majority of their customers. This relationship prevents the need for a third party certification, as the farmer can directly inform their consumer about the food they produce. Thus, participants in this study were not motivated to acquire organic certification based on personal ideologies. They did not seek certification and frequently disagreed with the NOP regulations. Participants were also not motivated by structural or social network pressures, as their consumers and fellow farmers were not pressuring them to obtain organic certifications.

This research has demonstrated that while participants are very unlikely to be involved with third party certifying agencies for Certified Organic, they are likely to apply for government funds. These government grants, discussed above, do have requirements and stipulations that the farmers are required to meet to be eligible for the grants. Therefore, participants might in some ways be influenced by government agencies to employ certain sustainable agricultural techniques, but not necessarily from the expected organizations like the NOP.
Limitations and Future Applications

Working with farmers in Mississippi was an extraordinary learning experience for the Principal Investigator. Not only was there an opportunity for the PI to build a relationship with each participant and to informally collect data through conversation and hands on learning, but the PI also learned the logistics of the physically demanding, yet deeply rewarding, labor that is invested by smallholders into their farming operations. While the PI benefited from conducting research in the same State in which he resided, this also presented its own set of difficulties. Many times, the researcher had to drive long distances to conduct the participant observation and interviews. Not only did this create an economic burden on the researcher, but it required a large amount of time which had to be dedicated to travel. While the researcher attempted to alleviate some of these burdens by staying overnight with friends or at a campground in different regions of the state so that multiple interviews could be conducted during a trip, more forethought could have been placed in this aspect during the design process.

As many anthropological researchers will admit, the application of research methods is learning process that almost always requires adaptation by the researcher. Plans are made before the researcher enters the field, and then they almost immediately fail in one way or another (Hoffman and Gardner 2006). Some of these design shortcomings are easily remedied by using a larger or smaller notebook to take notes or positioning the voice recorder to make the recordings more audible. However, oftentimes research design flaws are not discovered until the data analysis phase, or even later. In this sense, this research project is no different than any other. This section will discuss a number of hiccups encountered along the way. Some of these design flaws were
remedied by the researcher and others were not. The researcher hopes that, if nothing else, the mistakes made throughout the execution of this research project will serve as a lesson for future researchers.

After completing the data collection process for this study, there were a number of limitations and shortcoming that were discovered by the PI. While the PI did attempt to design the research project to the best of his ability, human error is at the root of many of the issues discussed in this section. Admission of shortcomings and reflexivity is important to ensure that the discipline continues to improve and that researchers learn from each other, not just about research, but the process of doing research. David M. Hoffman (2006:20) discusses an anthropological researcher’s difficulties in the field when he says, “it is a well-known part of anthropological folklore that the best laid research plans will be spoiled by unexpected situations, and it is the job of the anthropologist to follow the courses that arise.” The following section will address the shortcomings faced by this researcher and the ways they were addressed.

Social Network Analysis

Social network analysis persistently presented problems for the PI throughout the research project. Unfortunately, during the research project design process, the PI misunderstood a pivotal concept regarding data required to accurately analyze a whole network. Whole network analysis requires ensuring that every person within the network is contacted and given the questionnaire (Borgatti, Everett, and Johnson 2013; Prell 2011). This is oftentimes done when a census of individuals is available. For example, to examine the commercial fishing population within Mississippi, one could acquire a list of every person in Mississippi who has a valid commercial fishing license. This would be a
whole network. The PI misunderstood this concept as having a list of individuals bound by the researcher. So in this research project, the PI obtained a list of sustainable farmers in Mississippi via an internship with GGSIM. However, this list was not a list of members of GGSIM, but a contact list that included farmers that were not members of GGSIM. Therefore, and as is evident in the data in the Data Analyses chapter, there are a number of individuals missing from the whole network, which makes any mathematical analysis via social network analysis of the whole network statistically unsound (Borgatti et al 2013; Prell 2011). Unfortunately the data collected was not sufficient to have much explanatory power, but it did have exploratory power. As demonstrated above, there are multiple networks of sustainable farmers in Mississippi who are interested in working together and improving the state of sustainable farming.

The misunderstanding of concepts was not discovered until long after all data had been collected. Since the flaw was discovered so late in the project, returning to the field to collect more data was not logistically plausible. At this point, the PI stopped data analysis and attempted to determine the best way to use the data collected in a way that would still contribute to the project. Ego network analysis, a method that focuses on the on a single participant’s social network was explored by the researcher. However, since the project was not designed with ego network analysis in mind, another critical piece of data was missing that is used for ego network analyses. The PI collected farmers, their alters, and data about the farmers relationships to their alters. However, ego network analysis requires that data is also collected from the participant about how they believe the alters interact with each other (Borgatti et al. 2013; Prell 2011).
Under guidance from advisors, the flaws in the data and limited explanatory power associated with them were accepted by the PI and the data was used to the best of the researcher’s ability. This is demonstrated in the social network data analysis section above. The social network data was used to explore the social network map of the participants (Figure 4), as well as to compare the strength of weak ties of participants and their alters. The demographic data collected via the SNAQ was also used to create the sample description above, which explained trends in averages of participants (age, number of years farming, etc.).

**Participant Observation and Semi-Structured Interviewing**

The semi-structured interview schedule designed by the PI for this research project also had a number of flaws that were only discovered during or after the interview process had been completed. There were a number of follow up questions that the PI did not consider asking until a participant brought the issue up. At one point, the PI had to call some participants that had already completed the interview process to ask them a few follow up questions the PI did not ask about specific government funding assistance received by participants. There were also a number of flaws identified during the transcription and qualitative analysis process. At one point, a participant asked the PI what the relevancy of a particular question had to the study as a whole. Because of these experiences with semi-structured interviewing, some of the topics addressed by this research project were more difficult to explore.

This researcher does recognize that the limitations with interviewing are partially due to lack of experience. As a Master’s level project, this project is as much a learning experience for the researcher as it is a contribution to the academic body of knowledge.
However, this researcher would advise other researchers at this same stage to get feedback on their interview schedule from as many people as possible before going into the field. Fully testing the interviewing process before entering the field, including recording and then transcribing, could have been invaluable to the data collection process of this research project.

**Future Applications**

This research is a case study of a small group of sustainable farmers in Mississippi. While it does investigate the motivations of these farmers and establishes a very basic picture of their social network, there is much more to learn about the application of alternative agriculture in Mississippi and the Deep South. First, a follow up study could be conducted to more effectively and accurately explore the social network of the participants in this particular study. With a more complete understanding of social network analysis, researchers could collect data that would allow for complete social network analysis, as was initially intended. This would allow the researcher to conduct more in-depth social network analysis, including analysis of centrality, multivariate analysis, and hypothesis testing.

This research works with participants who are self-identified sustainable farmers by choice. However, as Shoreman and Haenn (2009) have demonstrated, there are also farmers in Mississippi who are employing a number of sustainable practices without sustainable goals or the knowledge of sustainability. There are individuals who employ sustainable methods out of necessity. They either learned how to farm from people who couldn’t afford conventional farming tools or chemicals, or they can’t afford those things themselves. This created a group of farmers who are producing food in a way that would
be identified as sustainable, but are unaware or unmotivated by the concepts of sustainability because their consumers are also unaware or unmotivated to purchase sustainably produced food. The PI believes that this group of farmers is significant in size, but would be much more difficult to access because they do not use sustainability or alternative agriculture as a marketing tool, and are thus less conspicuous sustainable farmers.

The general goals of this study could also be expanded to other farmers in other states who are producing food sustainably or alternatively and then compared to farmers in Mississippi. A study designed in this way would be able to determine if the farmers in Mississippi use particular sustainable methods that are not used in other states or vice versa. It would also be capable of determining if the networks of sustainable farmers are connected to sustainable farmers in other states. For example, farmers who participated in this study were asked to list only sustainable farmers that they knew in Mississippi, but many farmers who lived near State lines or who attended regional sustainable farming conferences discussed knowing sustainable farmers in other states, which were not included in this study. This suggests that there is a social network of sustainable farmers across the Deep South that may be at least sharing information, if not other resources.

As discussed above, applied anthropologists have the potential to help farmers in this situation with their networking and communication. An anthropologist, employed by one of the non-profits discussed above or by the government, via agricultural extension, could work with a similar model employed in this research project. The applied anthropologist could work with farmers, especially new farmers, to build their relationships with other sustainable farmers. Databases and contact lists of farmers
willing to share or sell information, resources, or equipment could be constructed and shared across the network. For example, as mentioned above, the farmers Elwood Foxworth and Erik Gardener share the cost of having organic fertilizer delivered to their farms. Foxworth and Gardner could share that cost with a larger group of farmers if there was an applied anthropologist connecting and coordinating sustainable farmers interested in working together. As well, the groups of farmers that are disconnected from the central network in this study could be connected. Networking could also be expanded outside of the state of Mississippi to interested sustainable farmers in neighboring states.

Finally, a major component missing from this examination of sustainable agriculture in Mississippi is the consumers who are driving the growth of the market. A number of different studies could examine these consumers, their interactions with farmers at markets or elsewhere, their motivations for purchasing locally produced sustainable goods, and/or their involvement with other local enterprise or sustainability as a whole. These consumers’ motivations and networks could then be compared to the motivations and networks of the sustainable farmers in Mississippi. Since this study does not examine customers at all, this section of people who are participating in sustainable agriculture across the State is deeply lacking study, and sure to produce a bounty of qualitative and quantitative data that could ultimately be useful for the farmers themselves.
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World Commission On Environment and Development (WCED)

APPENDIX A

SOCIAL NETWORK ANALYSIS QUESTIONNAIRE
Informant Information:
1. Case ID: 

2. Age: 

3. Sex: 

4. Farm Name and Location: 

5. Highest level of Education: 

6. Marital Status: 

7. Number of years farming: 

8a. Choose one of the following as your main method of selling your products:
a. Farm-to-Restaurant  
b. Farm-to-School  
c. Cooperative  
d. Farmers' Market  
e. Value-added products  
f. Community Supported Agriculture (CSA)  
g. On Farm Sales 

8b. Choose any of the following categories of things you produce and sell:
a. Vegetables  
b. Fruit  
c. Meat  
d. Eggs  
e. Dairy products  
f. Value-added goods  
g. Flowers  
h. Herbs  
i. Nuts  
j. Grains  
k. Other (list): 

9. Please list the all of the farmers you know that would also consider themselves sustainable farmers.


10. For each person listed for Question 9, please answer the following.

1. Name?

2. Age?

3. Contact Information? (phone, email, etc.)

4. Farm Name and Location?

5. Choose one of the following as their main method of selling their products:
   a. Farm-to-Restaurant
   b. Farm-to-School
   c. Cooperative
   d. Farmers' Market
   e. Value-added products
   f. Community Supported Agriculture (CSA)
   g. On Farm Sales

6. How would you define your relationship with them? (e.g., mother, neighbor, friend, colleague, partner, etc.)
7. How long have you known this person?
__________________________________________________________________
__________________________________________________________________

8. On a scale of 1-5 how much do you trust this person as a source of knowledge about sustainable agriculture, with 1 being very untrusting and 5 being very trusting?

1 2 3 4 5
Very Untrusting Somewhat Trusting Very Trusting

9. On a scale of 1-5 how strong is your relationship with this person, with 1 being very weak and 5 being very strong?

1 2 3 4 5
Very Weak Neutral Very Strong

10. On a scale of 1-5 how important is your relationship with this person to your farming operation, with 1 being not important at all and 5 being extremely important?

1 2 3 4 5
Very Unimportant Neutral Very Important
11. On a scale of 1-5 how often are you in contact with this person, with 1 being once a year or less and 5 being once a week or more?

   1  2  3  4  5

Once a Year   Once a Month   Once a Week

12. Do you know what types of goods this person produces on their farm? If yes, please pick the categories.

   a. Vegetables
   b. Fruit
   c. Meat
   d. Eggs
   e. Dairy products

   f. Value-added goods
   g. Flowers
   h. Herbs
   i. Nuts
   j. Grains

   k. Other (list):

   ____________________
   ____________________
   ____________________
13. Do you go to this person for advice, knowledge, or any other information regarding your farming operation?

__________________________________________________________________  

__________________________________________________________________  

13a. If so, are there any particular topics about which you ask this person for advice?

__________________________________________________________________  

__________________________________________________________________  

__________________________________________________________________  

__________________________________________________________________  

14. Do you both belong to any organizations? (farm or non-farm related, e.g., church, garden club, etc.)

__________________________________________________________________  

__________________________________________________________________  

__________________________________________________________________  

__________________________________________________________________  

__________________________________________________________________
APPENDIX B

INTERVIEW SCHEDULE
Case ID:________________________________________________________________
Age:____________________________________________________________________
Sex:____________________________________________________________________

Highest level of education?
_______________________________________________________________________

Household size?
_______________________________________________________________________

Where is your farm located?
_______________________________________________________________________

How many acres is your farm?
_______________________________________________________________________

What portion of that is being used for production?
_______________________________________________________________________

Please list the usual things that are produced by your farm?
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

Do you try to sell everything you produce to consumers?
_______________________________________________________________________

Why or why not?
_______________________________________________________________________

Is the farm your only source of annual income?
_______________________________________________________________________

If no, what percent of your annual household income is derived from your farm?
_______________________________________________________________________

How long have you been farming?
_______________________________________________________________________

Have you ever considered yourself a conventional farmer?
_______________________________________________________________________
Do you consider any of the agricultural practices that you employ to be alternative and/or sustainable? If yes, please answer the following.

________________________________________________________________________

________________________________________________________________________

Why sustainable or alternative agriculture instead of conventional?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Please list the practices that you employ on your farm that you would consider to be sustainable?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

How long have you been employing these alternative practices?

________________________________________________________________________

________________________________________________________________________

Is your farm certified in any way?

________________________________________________________________________

________________________________________________________________________

Do you have any relatives who are farmers?

________________________________________________________________________

________________________________________________________________________

If yes, would you consider their practices sustainable?

________________________________________________________________________

________________________________________________________________________

Do you run a community supported agriculture (CSA) program? If yes, please answer the following.

________________________________________________________________________

________________________________________________________________________

How many members do you have?

________________________________________________________________________

________________________________________________________________________

How much do they pay for a share?

________________________________________________________________________
Do you offer workshares?

Do you have a waiting list?

Is all of your farmland dedicated to the CSA?

If not, what percentage of your farmland is dedicated to the CSA?

If not, what percentage of your farm’s total income comes from the CSA?

Do you sell your goods at a farmers market on a regular basis? If yes, please answer the following.

Which farmers market?

How often do you go?

Do you sell your goods at the farmer’s market for more or less than you do in other types of markets?

What percentage of your farm’s total income comes from farmers markets?

Would you recommend other farmers to participate in similar programs?
Are you a supplier for a farm-to-school or farm-to-restaurant program? If yes, please answer the following.

________________________________________________________________________

Which school or restaurant do you supply?

________________________________________________________________________

How often do you distribute food to them?

________________________________________________________________________

If farm-to-school, do the students participate in any farming activities?

________________________________________________________________________

What percentage of your farms total income comes from these programs?

________________________________________________________________________

Would you recommend other farmers to participate in similar programs?

________________________________________________________________________

Do you have a roadside or on-farm stand? If yes, please answer the following.

________________________________________________________________________

Where is it located?

________________________________________________________________________

How often do you set it up?

________________________________________________________________________

Do you sell your goods at the stand for more or less than you do in other types of markets?

________________________________________________________________________

What percentage of your farms total income comes from the stand?
Do you have any other method of selling your produce? If yes, please answer the following.

________________________________________________________________________

Please list the other methods you use to sell your produce.

________________________________________________________________________

What percentage of your farm’s total income comes from each?

________________________________________________________________________

________________________________________________________________________

Were you interested in sustainability before you became a sustainable agriculturalist?

________________________________________________________________________

________________________________________________________________________

How so?

________________________________________________________________________

________________________________________________________________________

Do you employ other sustainable practices that are not associated with your farming?

________________________________________________________________________

________________________________________________________________________

Like what?

________________________________________________________________________

________________________________________________________________________

When discussing sustainability and sustainable agriculture, people often refer to the “three pillars of sustainability.” These pillars are the economic pillar, the environmental pillar, and the social pillar.

________________________________________________________________________

Are you familiar with this model of discussing sustainability and/or sustainable agriculture?

________________________________________________________________________

________________________________________________________________________

If so, do you try to use this model in operating your farm?

________________________________________________________________________

________________________________________________________________________

Do you think that any of those three pillars are more or less important than the others?

________________________________________________________________________
If so, how would you rank them?

________________________________________________________________________
________________________________________________________________________

Are you a member of any international, national, regional, statewide, or community level organizations that help to support your sustainable farming?

________________________________________________________________________
________________________________________________________________________

If so, which ones?

________________________________________________________________________
________________________________________________________________________

If not, why not?

________________________________________________________________________
________________________________________________________________________

Please discuss some of the logistical difficulties you have faced as a sustainable farmer.

________________________________________________________________________
________________________________________________________________________

Have you received any financial support to continue your farming operation?

________________________________________________________________________
________________________________________________________________________

Please discuss some of the social difficulties you have faced as a sustainable farmer.

________________________________________________________________________
________________________________________________________________________
APPENDIX C

PARTICIPANT OBSERVATION AND INTERVIEW RECRUITMENT SCRIPT
Hello, my name is Casey Odom. I am a graduate student at Mississippi State University in Applied Anthropology. I met with you recently for the first phase of my research on sustainable or alternative farmers in Mississippi and you have been selected as a potential participant for the second phase. I recall that you said I may contact you for future research and I was wondering if you would be willing to participate in the second phase. This project is intended to analyze the motivations of small, self-identified, sustainable agriculturalists in Mississippi. This phase of my research involves me visiting your farm for at least one full working day. This will help me to get a better understanding of your day to day farm operations. Following the working day, I have a semi-structured interview that will take between 60 and 90 minutes to complete. Your identity will not be directly linked to your responses in any publication that may be generated from this research. Do you have any questions about my research? Would you be interested in participating? If yes, is there a good time for me to visit your farm?
APPENDIX D

SOCIAL NETWORK ANALYSIS RECRUITMENT SCRIPT
Hello, my name is Casey Odom. I am a graduate student at Mississippi State University in Applied Anthropology and I am doing my Master’s thesis research on sustainable or alternative farmers in Mississippi and I was wondering if you would be willing to participate in my study. This project is intended to analyze the social network and motivations of small, self-identified, sustainable agriculturalists in Mississippi. This phase of my research involves me visiting your farm and asking you some questions about your social network. A social network is a structure of connected individuals which is used to show which individuals in a group are tied together and how those relationships are important. The questionnaire would take between 30 minutes and 1 hour to complete. Your identity will not be directly linked to your responses in any publication that may be generated from this research. Do you have any questions about my research? Would you be interested in participating? If yes, is there a good time for me to visit your farm?